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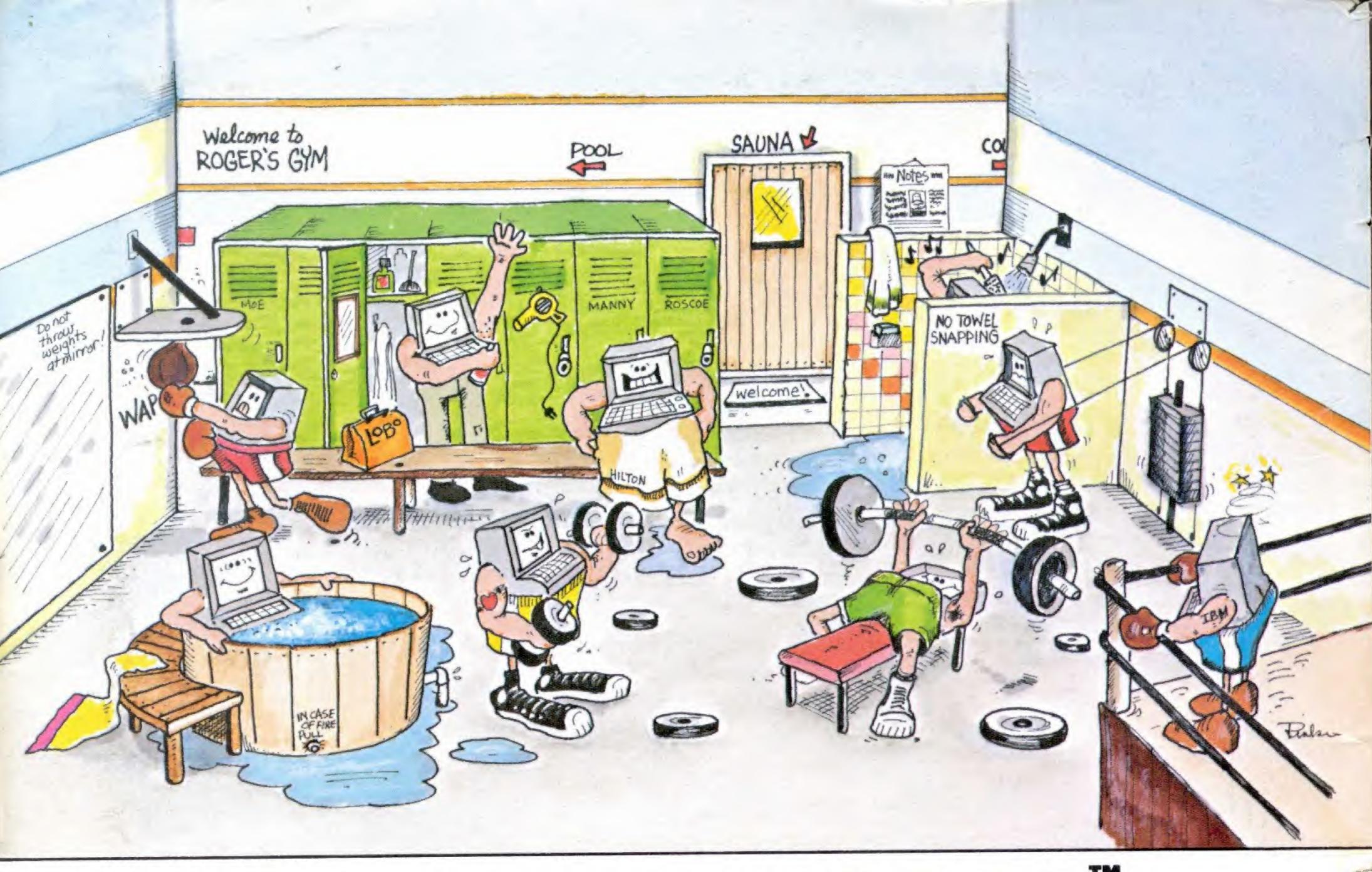
THE TRS-80 USERS JOURNAL

Jul/Aug 1981

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Product evaluations have become increasingly valuable to our industry. They have been around a long time in other markets: audio, auto, photo, etc., and they have played a very important part.

It is the audio industry which appears most like our own: we both have hardware - receivers and computers, speakers and printers, turntables and diskdrives; software - records and tapes with music and other sound programs, diskettes and cassettes with games, utilities, and applications programs; and media - raw tapes and record vinyl and blank disks and tapes. And, like the audio industry, ours pours forth new products by the hundreds and thousands every year. Some are good, some bad and some - hard to describe.

All of this production places a burden of responsibility on the editorial staff of the magazines which support our hobby, business, or necessity. And, in doing evaluations, none of us are prepared to do the job adequately. Nor are we likely to do so in the very near future.

One reason for this is the diversification of the microcomputer industry. Even if we stayed with just one model, like the Model II, the field is too broad. Even the Tandy Corporation, grandaddy of the home microcomputer, has a large staff devoted to doing just one thing, evaluation.

For every piece of application software, a segment of the industry exists. An example is the VISICALC user group and supportive publication. Other major application packages could also benefit from similar groups: Scripsit, DBM systems, Communications, Math, History, the arts in schools; languages like FORTH, LISP, PASCAL, Level II Basic, Disk Basic, FORTRAN, COBOL - the list goes on.

We, as an industry, have never established an independent group of professional evaluators, like the Hirsch-Houck Lab of the audio industry. Anyone who has watched the development of this lab over the decades (yes, tens of years) will realize that it cannot be done overnight.

Our industry is the fastest moving consumer industry in existence. Since the stereo record was introduced in the fall of 1957, the audio industry has seen the cassette, FM-stereo, and noise reduction systems as major innovative advances. The rest has been a refinement of the state of the art. In the same time span, however, our industry has seen major advances in every area, from the electronics (transistor, integrated circuit, single-chip CPU) to printers (high speed dot matrix, ink jet, and thermal). And this doesn't cover things like

video displays, floppy disks and semiconductor memory. On the horizon we are looking towards flat screen displays, copier-printers, bubble memory, the video disk, and others.

On top of that add the fact that other than Radio Shack, not one manufacturer has produced anywhere near the number of consumer products and accessories as a typical audio company. In addition, most products are not directly compatible or comparable. Benchmark tests between Apple and TRS-80 are meaningless because they operate so differently and have such difference in design philosophies.

This is a most incompatible industry. While you can hook up just anybody's turntable to anyone's receiver, you can't mate an Apple disk drive to a TRS-80 Model II; or a Model II drive to a Model I or III, for that matter. The audio industry isn't like that. Go into a local stereo shop and look at all the different brands of receivers, speakers, tape decks and turntables. All are totally compatible!

So where does the computer industry stand? At best we are ready to do only a limited job on hardware and a fair job on software.

For instance, where are power consumption measurements for the hardware? And where are measurements of heat output, performance under various conditions like temperature and voltage fluctuations? How about RF radiation, speed, power supply stability, serviceability, maintenance agreements, mean time between failure, and so on? Are these really necessary? Is safety a factor and should you know that many micros don't even carry U.L. Labels? How good is the documentation, the factory support, and so on?

Most software evaluations come from users who are ill-equipped to do the job adequately. Sure, games are easy and fun. That's why you see so many of them reviewed. Utilities are also great and if one catches a user's eye and he writes a good review, it will get published. But what about practical applications? Like Accounts Receivable, General Ledger, and so on? Who is to say that a particular general ledger package will do the job for a doctor? A school administrator? Not likely. And visa-versa. Even non-committal evaluations don't always do the job without extensive charts and testing.

Will evaluations improve? We certainly think so and we hope we are on the right track.

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JOURNAL

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DISTRIBUTORS Europe

Hofacker Verlag Tegernseer Strasse 18 D-8150 Holzkirchen/Obb West Germany

Canada

Graymar Data Services Ltd #4-258 East 1st Avenue Vancouver, B C V5T 1A6 Canada

Printed by

North Plains Press Aberdeen, South Dakota

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Advertisers: The Journal will accept limited relevant commercial advertising which pertains to, or is for use on the Tandy Corporation microcomputers. Write for a current rate schedule.

Authors: We constantly seek material from contributors. Send your material (double spaced, upper/lower case please) and allow approximately 4 weeks for review. Programs must be supplied in machine readable format on disk or tape. Text files may be on diskette. Media will be returned if return postage is provided. Cartoons and photographs are welcome. Generous compensation will be made for non-trivial works which are accepted for publication. The Journal pays on acceptance rather than on publication.

The Cover

Our cover this issue shows model Andrea Angeline viewing the Color Computer. The computer screen was the only light source for this photograph. Frederick A Johnsen is the photographer.

Subscription price in the United States is \$16.00 for one year, \$31.00 for two years and \$45.00 for three years.

Canada & Mexico: \$20.00 per year, no two or three year subscriptions.

All Other: \$30.00 per year surface mail, \$48.00 per year via airmail. Two & three year subscriptions not offered.

ISSN Publication #0199-1035

Published bimonthly in the months of January, March, May, July, September and November by 80-Northwest Publishing Inc 3838 South Warner Street, Tacoma, Washington 98409

Printed in the United States of America

POSTMASTER: Please send change of address form 3579 to 80-U.S. Journal, 3838 South Warner Street, Tacoma, WA 98409

Second Class Postage Paid at Tacoma, Washington and at additional entry point.

80-U.S. Journal Jul/Aug 1981



THE TRS-80 USERS JOURNAL

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LETTERS

I am in the process of devouring your Mar/Apr 81 issue and loving it! I would like to pass on a correction for John Junod's "Computer Yahtzee" program and a comment on programs you list.

If you take a -1 for a roll the computer will not add this into your total score until you get some positive points. If you have to take a -1 for your last turns your final score will not be correct. What I did was change line 490 to read: 490 GOTO 520. This will cause the computer to immediately add up your total score no matter what kind of points you get, positive or negative. The program was fantastic. (Reading it without spaces in the listing was a bear!!!)

Why don't you as a magazine request program listings to be submitted in an easy to read format, WITH SPACES!?!?!? I'd like to do your \$urvival program but I'm not up to staring at another listing for awhile.

Until next issue, keep on keeping on.

Dave Bower Virginia Beach, VA

I am a TRS-80 owner with two disk drives. I have been reading articles about 40 track disk drives. I also have been reviewing articles about SUPERZAP. My reason for this letter is my interest in getting the use of the five extra tracks. Is it possible trough the use of SUPERZAP to modify TRSDOS 2.2 to use these tracks? If so could you do an article on the subject or at least tell what programs have to be changed?

I like your publication very much and look forward to its arrival. You tend to present more useful information to the home computer bug than other publications.

Ken Weidmann Newbury Park, CA

Most people who obtain SUPERZAP do so with a version of the NEWDOS operating system. While the machine language version does not require NEWDOS, the Basic versions do and as such you will end up with a DOS which will support the 40 track capability. -Ed

I have recently purchased an "In-Memory Information Package", Model 26-1501, from Radio Shack and have come upon a problem I'd like to make other TRS-80 users aware of. When you write your data on the data tape that comes with the package, it may start on the leader for the tape and void the whole program. I discovered this after spending 2½ hours entering data on that tape.

Radio Shack specifically states that you must use leaderless tapes, so why do they supply leadered tapes with their software packages?

William R. Alsing St Louis, MO

Whenever you use ANY tape, leaderless or not, it is a good idea to run it in to a count of 5 or 10 past any possible tape that has been improperly handled during assembly. This has always insured good results on good tape. -Ed

I love my Electric Pencil, but I use Scripsit for my word processing. However, having put the "Electric Pencil Lowercase modification" in my TRS-80 before there even was a Scripsit, I have a perfectly good control key that Scripsit doesn't use. I'm tired of using the "@" sign for a control key. Has anyone patched Scripsit to use the Pencil control key? If they have, I would appreciate hearing how to go about it.

John T Phillipp Brooklyn, NY

Looking through the Mar/Apr 81 issue, I noticed the article "System/Command". In general, it was rather informative. One thing was left out though.

This has to do with the address 0249 and 0250, which deal with the timing during tape read operations. Phil Pilgrim mentioned that the change (0249 was 41, now is 60 and 0250 was 76 now is 85) allowed marginal cassettes to be read easier. That may be true, but the Radio Shack Editor/Assembler would no longer load!

Thankfully, Radio Shack has a cure for this. By taking your old copy to one of their computer centers, they will modify your old version to operate with the new Level II ROM's. Whether or not Radio Shack has a mail-in version of this modification is unknown to me, but you might check with them.

Hope this may help some of your readers. Keep up the great publication you have.

> Paul Scanlon Van Nuys, CA

Radio Shack's Tape Editor/Assembler and several other programs were duplicated out of phase. This created havoc with the new ROM routines. As a result, you may take your old original tape to any Radio Shack company store and they are supposed to mail it to Ft Worth for replacement. However, if you own one of

the tape duplication programs, you may do this yourself by simply creating a new copy of the original. This may be done on a machine with the old ROM. -Ed

I finally have found enough time to type in Phil Pilgrim's "KEYQ" program (System/Command, Nov/Dec 80) and discovered it provides us non-disk owners with a way to have the computer load, run, and pass any variables to a program (if you know the correct order) automatically.

Let's say you had promised friends to run your loan program for them, but they are at the door and you don't wish to be stuck at the keyboard. With "KEYQ" active, here is all you need to do:

Put the CPU in the halt state by typing the SHIFT@. Then push the CLEAR key followed by ENTER. Then type CLOAD"X" (where X is the program name) ENTER; RUN; ENTER and then the necessary values (each followed by an ENTER).

When done, unhalt the CPU by pressing SHIFT@. The screen will clear then print CLOAD"X" and the tape starts moving. When the computer finds your program it will load it and run it while you enjoy the company and a cool beer.

The CLEAR key must be entered first as it removes the two @ symbols you generate halting and unhalting the computer. If they remain there, you end up with a syntax error since @@CLOAD is meaningless.

By the way, I think Grace McNamara does a superb job in the layout/design department. It sets your magazine well above the others.

Thomas M Cost Lawton, OK

Thank you for the fine suggestions. Grace McNamara works very hard with layout/design and thanks you for recognizing that effort. -Ed

I take exception to M Barlow's Mar/Apr 81 criticism of Cameron Brown's review of Versafile (Sep/Oct 80). Why should Versafile run on powerup? Nothing else does, except TRSDOS sometimes. Global Search and Multiple Kill are derided as jargon. Of all "Computerese" these are two phrases that do make sense to a novice.

Then you condone Barlow's criticism by apparently referring to his mother-in-law's inability to read eight pages of "big print and pictures" instructions as sophistication. Shame on you.

I bought Versafile on the strength of Cameron Brown's review and have enjoyed using it very much. Why haven't there been corrections to Mike Zielinski's

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31 East 31st Street, New York, N.Y. 10016 (212) 889-8975 Circle 34 article on improving Versafile? Doesn't anybody else use it? Several typographical errors are included in the additional lines in the text of the article and some things don't work at all. For instance I get an Illegal Function error in 8070. Maybe your readers are all so unsophisticated they can correct the errors without your help.

Brian K Wood Loma, MT

Maybe you're right. But, we have had no problem with Zielinski's additions (Jan/Feb 81) at this end. -Ed

From what I've seen of your magazine you don't have a regular question and answer column. If you did I could single-handedly keep it full of questions. Here are a few:

Why can't I RENAME Scripsit?

How do you COPY full non-systems disk with two drives?

When does Radio Shack's ULCDVR/CMD cause problems? How do I get it to work with NEWDOS?

Speaking of NEWDOS, when will Apparat quit their boasting and get around to writing some adequate documentation? (Note that I only ask for adequate, not good documentation.)

Does anyone give awards for insufferable documentation? I nominate Racet. Has someone somewhere thoroughly explained their GSF and DOSORT? They could be fantastic utilities.

I assume that it is generally known now that TRSDOS will support variable length records. I've experimented with it and, indeed, it does work. But I've been afraid to use it on valuable data. I would appreciate a report by someone who has used this "secret" feature without fear and trembling. Do you know someone?

Has your magazine already answered these questions?

Jerry George Bainbridge Island, WA

No.

Scripsit on the Model I can be renamed to any name you want. Just don't forget the /CMD extension. I use SSL/CMD, and type in SSL to bring up Scripsit.

The TRSDOS BACKUP utility is completely self prompting. So once it is in the system, you may make backups of nonsystem disks.

I am unaware of any ULCDVR/CMD problems other than the lower case keyboard does not always work with some machine language programs, such as early NEWDOS operating systems.

As far as documentation goes, the industry has to realize they need to write for people who know little or nothing about the computer they are using. Then, and

only then, will the documentation improve.-Ed

First excuse my bad English. I passed the school 20 years ago.

In your Nov/Dec 80 issue, page 6 in the right column you brought very good things for the Microline. The best of all POKE 17360,255. That's a big help. Thanks!

My question: Do you know what to do in NEWDOS80 and VTOS 3.04 to print the graphics with the Microline?

Gerhard Seiler W Germany

The NEWDOS80 system command, SYSTEM AK=Y, will allow graphics to be sent to the Microline with the JKL feature. - Ed

Regarding your LLIST/CMD article on page 47 of the Nov/Dec 80 issue, could you expand a bit how to invoke the formatting routine? I believe it should be automatic since it patches into the DCB driver address. However, whenever I load it and try to LLIST or LPRINT, I find myself confronted with the old "Silent Death".

I am relatively new to disk operation and I don't understand everything I know about its workings. Although I'm probably missing something obvious, I need help to see it, so - Help! Any assistance will be appreciated.

Other than this problem, I enjoy 80-U.S. very much. Keep up the good work.

James H Fox Afton, MN

The answer lies in your assembled code, which you need to recheck against the magazine listings. You are right, the routine is invoked whenever LLIST or LPRINT is received. Are you trying to do this with a serial or parallel printer? From the sound of things, the program is running off into unknown places in memory and hiding. Make sure that your code directs the output to the printer port. -Ed

Your magazine has really covered the Model I very well. I am looking forward to seeing the same coverage of the Color Computer's capabilities.

In particular, I would like to know if you have a set of values to poke into memory to speed up the computer or return it to normal. Another area I would like to see you cover is machine language on the MC6809. Also I would like to see a program to set up the computer with the Radio Shack DC Modem I as a smart terminal.

Tom Grumbling Fredericktown, OH

I purchased Microfiles from Radio Shack, which is a data management system program written in machine language. The program was written for Radio Shack by

Robert G Kilgus, whose address I do not have. My equipment is a TRS-80 Model I.

I find the program useful but it has one very serious weakness. There is no provision for performing simple arithmetic operations, such as addition, on any of the records in the file. If after sorting by class one could add the data in one set of records of the class, it would very greatly improve the usefulness of the program.

If someone has modified the program to perform this task I would gladly pay a royalty to use their work or if someone knows how the data is formatted/handled by the computer and would supply me the information, I would try to modify the program to do this task.

George A Downsbrough 1000 Fillmore Road State College, PA 16801

While Microfiles is an excellent and efficient data handler, it uses its own file management and format. This is not secret, it is a variable length file and thus normally unaccessible from Basic. -Ed

I own a Model I, Level II TRS-80. I am very happy with it in all aspects - but one. The graphics. I was wondering if you knew any way to get high resolution, color graphics for the TRS-80. I am sure many TRS-80 owners would be interested.

Nick Souleles Glenview, IL

Without spending at least \$399 for the color computer, plus the cost of a color TV, the Model I, II and III are all designed to be black and white only. The Model II does have possibilities with a different video board, but the other two do not, except as an external device. Several have been marketed. -Ed

Re: Computer Yahtzee. There is a problem in the data statement. The value of a large straight is 40, not 45. Line 90 should be 3,6,9,12,15,18,0,0,25,30,40,50,0

Is there any computer scrabble game for a 16K Level II TRS-80 Model I computer? Keith Haley Bellevue, MI

We are currently evaluating a Scrabble game for possible future publication. -Ed

I like your user journal very much - keep up the good work. The reason I'm writing you is this: I have a copy of NEWDOS80 and everything works wonderful, and I read the fine article about custom operating systems and really got a lot out of it.

The problem I'm having is that after I format drive one to 43 tracks NEWDOS80 SUPERZAP will not look past 40 tracks. I even tried to PDRIVE #1 or #0 drive to see if it would help but it didn't. Do you think you could help me? The drives are both Tandon drives from Radio Shack. NEWDOS80 does remember to format drive 0 or 1 to 40 tracks without telling it to, also if I copy

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from drive 0 to 1, typing in that there are 43 tracks, after copy is complete, DIR shows there are 43 tracks and 83 grans. NEWDOS80 will not fill the disk up past 40 tracks - it will come back and read DISK FULL even when DIR shows grans left.

Also tell F L Eskholme S W E D U M that if he would lubricate the two shafts the heads travel on, the noise will go away. (See Letters, May/Jun 81 issue). The way this is done is as follows:

- 1. Take cover off the disk by taking out four screws.
 - 2. Get a "Q" tip swab.
 - 3. Put some light machine oil on it.
- 4. Rub this on the shafts where heads are located.
 - 5: Be careful not to use too much oil.

I had this same problem and this got rid of the noise

> Douglas Thielen Woodlands, TX

Our drives are the older Shugart drives from Radio Shack, so we have been unable to chase your problem. Another letter in this issue talks about SUPERZAP/BAS getting past the 40th track. And thanks for the tip on noisy Tandon drives. By the way, keep that oil to an absolute minimum or you may find a gummy mess in the future. -Ed

Herewith, about 6 months early, my subscription renewal. David Busch's tip in the May/Jun 81 issue that newer Radio Shack drives will accommodate a custom

designated 44 track NEWDOS80 diskette was worth a year's subscription alonel It works for DBLDOS too, yielding an extra 14 grans of space, and the Basic version of SUPERZAP can easily be modified to read a 77 track directory. Keep up the good work.

Now, what about somebody doing an article on how to make a program compatible with all the DOS systems on the market? Yes, it can be done - I'd just like to know how.

> Michael M Finefrock, PhD Charleston, SC

It probably can be done, but is it worth the effort? -Ed

I really had a ball with the NFL-PIX program. I could see by the line numbers that it had been stripped down to fit into 16K. So I put back some of the bells and whistles. Especially the sort, so the standings would have the team with the most wins printed first. I have part of the coming schedule and as soon as I get the rest will be all set for next season. I wonder if it would be practical to have several versions of different core sizes, such as; stripped 16K and complete 32K. I use 48K and dislike getting a stripped program just so it will fit into 16K.

It is not possible for me to tell you how much I enjoy your magazine. I even read all the ads. You may rest assured that when I order something I mention that I read it in 80-U.S.

Please keep going and doing the same excellent job in the future.

> Stanley J Hesley 4934 Siesta Drive Oceanside, CA 92054

You might find it interesting that one of the new products we received from Acorn Software is made just the way you describe. A disk owner will get an expanded version while a tape user will get a stripped version of Everest Explorer. I think this will be something we will see more of in the future. -Ed

Reference 80-U.S. May/Jun 81 page 20, Items at Random. Here is my input on what I'd like to see. I'd like to see "many" articles on the listing of programs using "Bar Code" format based on the "PaperByte" system; the optical reader/wand and the interfacing with the TRS-80, that is, hardware and software articles; and the possibility of listing some programs in 80-U.S. (in the near future) in PaperByte Barcode format.

> J Trinque Clinton, MA

Some interesting possibilities here. The PaperByte system was published in Byte Magazine some years ago, and I thought it might take hold. However, it never really got off the ground. -Ed



Three and a half years ago Bill Schroeder was trading in the stock market and felt a computer could help in that activity. With the advent of low cost units like the Radio Shack TRS-80, he took the leap.

Other than reading a few books, he had never operated a computer before, and like most of us, was bitten by the bug when he acquired his first Model I Level I. It all started with his programming a TRS-80...

80-U.S. - How did Galactic Software come about?

Bill - After being in it a short time, I found a natural ability for it and initially wrote some programs for the Tandy Corporation under contract. We formed Galactic about two and a half years ago as a division of an existing corporation. That corporation had been in business eleven years, so it was very stable and financially able to start a new venture. Now we have some 3000 square feet of office space and this division has five full time employees, plus three associates across the country.

80-U.S. - What were the early programs you wrote for Tandy?

Bill - Versafile for the Model I and II, the Communications Packages for the Model I and III. We wrote Tandy's national parts ordering system which allows every service department in the country to order their parts from Fort Worth on a daily basis over the telephone. This data communications system was the first network Tandy ever implemented.

80-U.S. - In writing software, Galactic has become known for its commitment to excellent software and documentation. How has this been accomplished?

Bill - We try to write only what will, from a practical standpoint, fit on a machine and work comfortably for the user. We don't believe a general ledger can fit on a Model I for most small companies. It is too big a program and it requires too much storage space which is just not available. So therefore, we don't have a general ledger.

We try to pick products that will fit and function very well. We write them so that the novice type computer user can be very happy with what he has got. And that, with the documentation (which should contain no technical terms), is so that the secretary in the office can start using it right away.

80-U.S. - Will Galactic eventually go beyond software, perhaps into books or hardware?

Bill - If we go into hardware, it would only be some very special small peripheral. We have nothing in our immediate plans that would have us do this.

In regards to publishing, yes, we will very likely be publishing something in conjunction with Mysosis.

80-U.S. - Recently Lobo Drives introduced their LX80 interface for the Model I along with a new product, LDOS, for which you were project

leader. Why another operating system?

Bill - When Lobo approached us we contacted one of our associates, Rov Soltoff, and we talked over the possibility of modifying TRSDOS, or modifying VTOS, or creating a brandnew operating system for Lobo's LX80 interface. None of the present operating systems as they are written function properly with the LX80. Something had to be done and Lobo wanted us to do it. We agreed to do it, and so LDOS came about. As it was being written to function on their piece of hardware, a natural evolution took place. It gave us the opportunity to place enhancements in it which we always wanted to see in a system. Roy did the lion's share of the actual writing of the operating system while we did the coordination and the production of the documentation.

80-U.S. - What about the rumors that LDOS is an upgraded version of VTOS 4.0?

Bill - In part, that is absolutely correct. Because of the time constraints, we could not write an original operating system from scratch. VTOS 4.0 was partially written to support the LX80 as it was. Randy Cook, the author of VTOS 4.0, was originally working for Lobo, but failed to complete the project. So the unlimited, non-exclusive rights to VTOS 4.0 were obtained and we started with that as a basis. We tore it completely apart, created pure source code out of it, and then began a massive modification project.



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MPI	NO	Sms.	YES	YES	125K bytes	YES	МО
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Internally, it is not as similar as people would think to VTOS 4.0. Externally, it is very similar. We kept it that way so that the users would not be confronted with a totally new syntax, a totally new way of putting in parameters, etc. We stayed upward compatible from both the media standpoint with TRSDOS and VTOS and upward compatible from the users standpoint when interacting with the DOS. There are many, many new parameters, new commands, new options, new functions in the system and a new support method. But all the ones that the people have learned to expect to be there in a TRSDOS-like operating system are still there.

- **80-U.S.** You say upward compatible with the media. Are you speaking of SCRIPSIT and some of the applications packages that have been released?
- Bill Yes, everything that has been released by Tandy, by Microsoft, and by most other vendors will run directly on the Model I using LDOS, whether it be on the LX80 or on the Radio Shack Interface.
- **80-U.S.** What is your relationship with Lobo and Tandy?
- **Bill** At present, Lobo is a client of Galactic Software and Mysosis.And Tandy is a client. We do things for them under contract, under purchase order and under royalty license.
- **80-U.S.** Is LDOS being expanded to work with other equipment?
- **Bill** Yes, by the time this is in print, LDOS will be available to the public on the Model III and by the end of the year we are hoping to introduce LDOS on the Model II and some selected S-100 systems.
- **80-U.S.** Could a user take his Model I SCRIPSIT or VISICALC and run it on the Model III under LDOS?
- **Bill** No, unfortunately because of some of the things Radio Shack has done in ROM and with the hardware itself this would be impossible. The SCRIPSIT from his Model I would not run in Model III. The Model III SCRIPSIT will run in the Model III under LDOS.

Where the media is compatible, a Model I diskette, containing a Basic program may be placed into a Model III and that disk and that program can be read, loaded and run with no problem.

Basic programs are transportable and files are directly useable. The only thing that is not useable would be machine language programs that use some undocumented calls, because those calls have moved. The documented calls that Radio Shack had in the Model I are, for the most part, the same. So, a vast majority of the Model I software will run directly on Model III LDOS without needing to be converted in any manner.

- **80-U.S.** You mentioned some selected S100 machines and the Model II. Is this going to be a TRSDOS-like operating system, such as LDOS is on the Model I?
- Bill It appears that it will not. We have the intention and we are working toward the goal that it will be CP/M compatible instead. It will also be TRSDOS compatible in regards to running Basic-type programs. But one has to face realities. There are a lot more CP/M programs out there than there are TRSDOS Model II programs. Therefore, we have elected to make it our best attempt to make this thing CP/M compatible, but also compatible from the standpoint of being able to read media with Basic programs and data files that are created under the Model II TRSDOS environment.
- **80-U.S.** The Model II currently has two DOS's, 1.2 and 2.0. Some of their software is intended to run only under 1.2. What about a situation like that?
- Bill That would be a machine level constraint again. And if it has a machine level constraint then we have a problem that it just would not run. If it were all in Basic it would run.

On the Model II we will be totally restructuring the operating system in its entirety. Existing operating systems, like 1.2 and 2.0 on the Model II, are totally incapable of handling hard drives in any responsive manner. So there will obviously have to be a new operating system coming from Tandy when they provide hard drives. Again, probably with no upward or crosscompatibility between media. We will not have that problem.

- **80-U.S.** What about the Basic used with this equipment?
- Bill The Basics will be compatible all the way through as the user should change machines or upgrade to a higher level of LDOS. We will always maintain that. And, you will be able to read a file entirely across if it is an LDOS operating system. It will be able

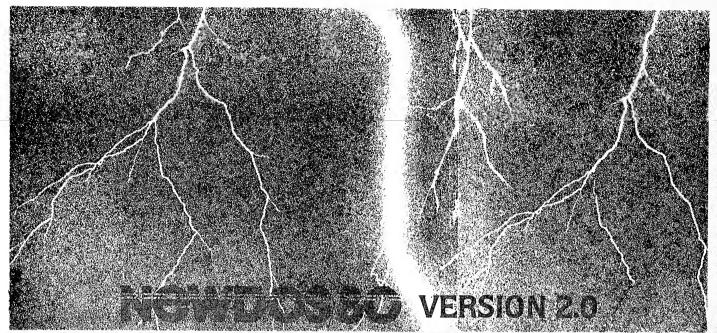
to read every other LDOS disk including hard disk. You plug your hard disk into your Cromemco one day and you want to plug your hard disk into your Model I the next and use that data file that was updated and worked on by the software in the Cromemco, it'll be perfectly readable and useable.

- 80-U.S. What about 16-bit CPU's?
- Bill We are studying the technical information available on the Z-8000 at present and looking at different development systems, including the Zilog development system and others. Yes, we will be proceeding into the 16-bit market with an operating system.
- **80-U.S.** And other computers besides the S-100 based systems such as Apple and Pet?
- **Bill** It's unlikely that we will enter the Apple and Pet market.
- **80-U.S.** Even with Microsoft's introduction of the Z-80 card for the Apple?
- Bill That's not a 100% conversion, turning the Apple into a Z-80 machine. There are problems with the interrupt structure and hardware clock is not available. So there are some constraining factors that would make a high-level operating system still a little impractical even using that method.
- 80-U.S.- Radio Shack is selling Ryan-McFarland's Compiler Basic for the Model II which is incompatible in many ways with the Basic Interpreter. We evaluated it, along with Microsoft's Basic Compiler a couple of issues ago, and stated that the compiler should be compatible with the interpreter.
- Bill That is probably the case if the interpreter is in ROM. In the case of the Model II, the interpreter is whatever is there. It's a totally RAM-based machine.

One has to look at those two languages from the standpoint of, "Are they even the same language?"

They both have their roots in Basic, but Microsoft's Basic came from an 8K tape based Basic and grew to an extended Basic, to a Disk Basic, and to an extended Disk Basic, and it is an excellent product. Ryan-McFarland's Basic came from a mainframe, went down to a mini, and now to a micro, and it is also an excellent product.

A person who knows how to program in Microsoft's 4.51 or 5.0 Basic, will not be comfortable or even



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able to do certain things in Ryan-McFarland's. But the converse is also true. Professional programmers who have worked on minis and mainframes utilizing a Ryan-McFarland type Basic will not be able to program in Microsoft's in a comfortable manner.

Rvan-McFarland's Basic is an extremely powerful business Basic, which forces a modicum of structured programming onto the user. Microsoft's Basic is flexible, but does not force any type of structure. It has dynamic allocation of additional RAM during string useage which Ryan-McFarland's does not. It also has the problem of losing precision with extended math functions in the large numbers businesses often have to deal with. Again, Ryan-McFarland's does not have this problem. It is designed as a business Basic, much more akin to the C-Type Basic than Microsoft's.

Microsoft's Basic has been on the market for several years, around five or so, and now it's being compiled. But remember, the first day that Ryan-McFarland's Basic was available many yars ago, it was a compiled Basic. So they were designed with completely different thoughts in mind. 80-U.S. - Other industries appear to be ages ahead of us in evaluations,

one of them being the audio industry with an independent testing lab such as the Hirsch-Houck Lab, which does reviews for several stereo and electronics magazines. The computer industry has never developed anything like this and very few evaluations go in-depth, such as power consumption, heat, radiation, and that type of thing. It is something that we probably won't see in the near future. What are your thoughts on evaluations?

Bill - I think that often the evaluations we see are by persons who are not well versed in the area they are evaluating. But these are the only people available, so it is not to be critical of what they are doing.

Let us say, hypothetically, you have someone who is going to review the Basic Languages that are currently available to the public. You find the situation where this person will probably have to know no less than eight or ten Basics that are available on micros. It is a little unlikely that a person will have all these different machines on which he can run all the different Basics and become familiar with them. It would take an awful long

Also, in our industry it is a little different than connecting up test equipment to an actual physical piece

of hardware. So much of this is subjective to the person doing the reviewing. Because it is subjective and all the reviews coming out are very much editorialized by the author, it is very important that editorial comment from the author be based on excellent experience and background with the product. He needs to compare competitive products to the one he is reviewing so that proper editorial comment may be drawn into his article and give proper information to the reader.

80-U.S. - What about the future for for Galactic?

Bill - There will be the 16-bit machine project; there will possibly be projects for machines outside the TRS-80 realm as other vendors request our services. There will definitely be hard disk support, both on the Model I/III and the Model II. That's all eminent. We have hard disks running here in our office and have for a considerable length of time, on all the TRS-80's, and we are very satisifed with what we have there. We will probably continue into the custom market as we have been, and into the systems software market, with assistance again, of Mysosis, because we found that what we are doing there is very well received. It is obviously a valuable

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ITEMS AT RANDOM

Corrections

Somehow we got carried away with the fact that the Mar/Apr 81 issue was almost letter perfect and didn't do the proof job on the May/Jun issue that we should have.

First we goofed in proofing the final version of the PEEK and POKE patch. In the Patch to Basic, the 6th line, last column should have read:

C=D04F4B

And the problem between the number zero and letter "oh" has been corrected in this issue with the OCR-B typewheel, which has a square number zero and an oval letter "oh".

Does anyone know of a Diablocompatible wheel that has a slash number zero and an up arrow for the left bracket in 12-pitch? If you do, send us the details.

The Sketch and Pack listing on pages 49 and 50 (May/Jun 81 issue) was confusing to many readers because of the above problem. Down to line 720 in the program, all zero's are just that: zero. Line 720 is the variable (letter oh equals number zero). Same with line 740. Lines 760 and 790 are all the variables of equals oh, etc. Line 810 is IF the variable oh is greater than 704 THEN variable oh equals zero. The PRINT@'s in lines 820, 830 and 850 are all PRINT@ variable oh, Lines 870 and 880 use the variable oh. The subscripted variable A in lines 910, 930 and 940 are numbers.

Our apologies to Leo on page 95 where one reader commented that our printer was trying to ween his press of ink (like I try to ween my car of gasoline). Somehow the plate was overexposed and not caught during the press run. Reference lines 21 and 22 are critical and hard to read in most copies. Line 21 reads:

1010 L=PEEK(16424)+PEEK (16425)*256-1

Line 22 reads:

1011 RESTORE:FORN=0T013: READD:POKEL+N,D:NEXTN

On page 99 reference line 26 should read:

1011 RESTORE:FORN=0T07: READD:POKEL+N,D:NEXTN

Reference line (27) 255 FORM=.. should be (28) 256 FORM=.. Also on page 99, the second column of text listing should be reference numbered 34 to 40 instead of 24 to 30.

The last number in the data statement of line 6050 in Space Marauder's listing should be 71.

YET ANOTHER IMPORTANT ANNOUNCEMENT!

WE GIVE UP!!

Our recent announcement, made only to Foreign subscribers, has brought such a torment of emotion that we must reconsider. Although foreign subscriptions account for only about 1.3% of our circulation, their voice was so strong after the recent postal rate increase that we now must make the following changes in foreign subscription rates:

Canada and Mexico remain at \$20. per year. They are sent via surface mail, and no two or three year subscriptions are offered. Essentially, this is no change from what it was previously. All other foreign subscriptions are now \$30. per year via surface mail and \$48. per year by airmail. Those currently on a surface mail rate may upgrade it to airmail by remitting the difference for the remainder of their subscription.

To all those who wrote about this situation, we thank you for your support and interest. Frankly, we should have sampled your opinions prior to making such a move. Please accept our apology, and however you choose to receive 80-U.S., we hope you continue to enjoy it.

We have probably sent more second copies of the Mar/Apr and May/Jun 81 issue than ever before. It's easy to blame the post office for the condition the magazine arrives in, and they are responsible for a certain percentage of battered and torn copies. But not that many! The problem, and the responsibility, rest right here, with us. For example, if a magazine gets into the wrong bag, it may be handled by people along the way several times more than it normally would have. That accounts for the wear and tear too. In an effort to eliminate some of this problem, and at the same time reduce mailing costs, 80-U.S. is now being printed and mailed from South Dakota. South Dakota?! Yes, that's right, since that is almost the geographical center of the North American Continent. From there, there is no place in the U.S. past postal zone 6, which saves money and should save wear and tear on the copies you receive. At the same time. about three-fourths of the country should receive their issues slightly earlier than before. Let's hope it works to everyone's satisfaction.

You may notice that in this issue TR Dettmann is conspicuously absent. Terry, unfortunately, has had a rather bad time of late with an ill son. His Files & Foibles installment, scheduled for this issue, will appear in the next, and we all wish both TR and TJ the best and hope to see both back in action soon.

Authors who have or are contemplating writing programs for TRS-80 should consider sending them to 80-U.S. We have a deal with the Exatron Corp, whereby we are able to offer a brand spanking new Stringy Floppy as payment for your work. Go for it!!

You have probably noted that we now sport a Universal Product Code (UPC) (those funny little stripes you find almost on any product these days). It arrived just before press time, and our only hope is that it dosen't clutter up the finer parts of our young cover model's anatomy. The price of growing up is sometimes hard to take!

Model II Users

Even with the problems associated with POKEing into video with the Model II, has anyone come up with a way to directly address the video RAM of the Model II? It lies outside the normal 64K boundaries of RAM.

We are still looking for the routine to disable and enable the BREAK key of the Model II under TRSDOS 2.0 and 2.0a.

In this Issue

In this issue we take a break and have some fun with Sundance by Jon Waples. For the Color Computer buffs, we made it run on your machine too, and added some music ala George Lucas.

With school coming up, some districts will want to try out the Student Timetable Printer program from Mr Sinclair. Those of you with printers will want to test throughput of your printer (and don't forget to send us the results), while R C Bahn explains Strings for those who are new to programming and Panattoni takes another look at those funny characters you get when you do your own lower case modification.

So, get youself a cool drink, go rest in the hammock with 80-U.S., and make yourself a fun summer. **Tom**

80-U.S. Journal Jul/Aug 1981

Color Computer Conversions and other goodies!

80-U.S. Staff

In this article we will discuss program conversions from Level II Basic into Extended Color Basic using Jon Waples' Sundance, found later in this issue. We will take a quick look at some of the material now available for the Color Computer.

Old timers will tell you the conversion they made from Level I Basic to Level II was a headache. For one thing, the two Basics were from two different sources and they used a slightly different syntax. The same is not true of the differences between Color Basic and Extended Color Basic. Extended Basic is just that—*EXTENDED*. However, Extended Basic is decidedly different from Level II Basic.

Missing and Modified Level II Keywords

Level II words that are missing or modified in Extended Basic are as follows: (Those which remain the same are given in Figure 1):

AUTO is not included. In Level II, this starts the automatic line numbering function and is sorely missed in Extended Basic.

The CLEAR command and statement now includes the capability of setting top of Basic memory as well as reserving string space.

DELETE, used to delete line numbers, has been replaced by DEL in Extended Basic.

The NEW function does not clear the screen in Extended Basic as it does in Level II. Otherwise, it is the same.

SYSTEM has been replaced by CLOADM (load a machine language tape), or DLOADM (load a machine language tape at a specified speed), and EXEC (which transfers control to a specified address).

DEFINT, DEFSNG, DEFDBL, CDBL, CINT, and CSNG. Color Basic and Extended Basic have arithmetic function precision to 9 places. There are no integers or double precision numbers as such, so these statements and functions are not needed.

There is no provision in Extended Basic for error trapping, hence ERROR, ON ERROR GOTO, RESUME, ERR and ERL are not included.

The FRE statement, used in Level II Basic to determine the amount of free string

space, is not in the color machine. However, MEM remains the same and does not return any reserved string space, free or otherwise.

The RANDOM statement has been dropped. Re-running a program does not reset the pseudo-random number generator. However, it will always return the same results on power-up.

The graphics and screen functions, SET, CLS, and POINT, have added a color parameter. RESET remains the same.

Port addressing and I/O (INP, OUT) instructions are not included in Extended Basic.

Level II had only one USR call. Extended Basic has ten, like Disk Basic, and has added the DEFUSR statement for addressing requirements.

The editing feature of Extended Basic is similar to Level II. However, three functions are no longer included. They are the cancel & restart (A), the save changes and exit (E), and the cancel and exit (Q) commands. The shorthand period (.) for current line number is not included

Line printer functions are included in Color Basic and Extended Color Basic. LLIST is the same, but LPRINT has been replaced with PRINT #-2.

New Features

AUDIO turns the output of the cassette to the television speaker for interactive tape instructions on or off. MOTOR controls the tape motion on the associated tape deck.

Further tape movement can be controlled by SKIPF which will advance the tape to the end of the specified file. Tape files, incidentally can support names up to eight letters in length.

Musical tones are supported with SOUND and PLAY. We used PLAY in Sundance to create a space movie theme.

Extended Basic includes OPEN, CLOSE and EOF statements for sequential data files.

CSAVEM allows the creation of machine language programs. However, you cannot duplicate program cartridges with this

method, as computer control is passed automatically to the ROM pack when the cartridge is inserted.

The color computer can support two joystick controllers. JOYSTK will return values for either the left or right stick.

There are a number of graphics statements in Extended Basic and the order of execution is critical to proper program operation. The statements are CIRCLE, COLOR, DRAW, GET, LINE, PAINT, PCLEAR, PCLS, PCOPY, PMODE, PRESET, PSET, PUT, and SCREEN. One function PPOINT, returns the color value of the specified graphics cell.

The HEX\$ function doesn't cast any spells, but it does return a hexadecimal value. Extended Basic has a TIMER function which can be set and then polled for timing purposes. We did not use this function in Sundance, but could have.

Extended Basic supports three statements found in Disk Basic, but not Level II. INSTR returns the position of one string in another. The LINE INPUT statement allows any ASCII character (except the ENTER key) that is on the keyboard to be input into a string variable. The last feature in Extended Basic found in Disk Basic is the RENUM, or renumber feature. TRSDOS Disk Basic uses the keyword NAME for this feature. It quickly renumbers all program lines and their references in the resident program.

Programming Color Graphics

This issue's cover shows the Color Computer using the program "Random Graphics" (it is Sample program 11 in the Extended Color Basic book). This program is a good short example of the sequence required for Extended Basic.

Three commands must be used in sequence. They are as follows:

- (1) PCLEAR will reserve up to eight 1.5K pages of memory for graphics. If not used, four pages (6K) will be reserved.
- (2) PMODE sets up the resolution to be used and the starting page of screen memory. In our case we selected the four color 128 X 192 mode and started with the

first page (PMODE 3,1). The Extended Basic book explains this in Chapter 3.

(3) SCREEN instructs the computer as to screen type (graphics or text) and color set (1 of 2 - either Black/Green and Green/Yellow/Blue/Red, or Black/Buff and Buff/Cyan/Magenta/Orange) depending upon the color mode.

Two additional commands are needed, but may be used anywhere and in any sequence following the PCLEAR statement:

- (1) PCLS will clear the current screen to as specified color.
- (2) COLOR sets up the foreground and background colors used by the other graphics commands.

High resolution graphics lines, boxes, arcs and circles used in Sundance may be created with the LINE and CIRCLE statements.

PUT, GET and PCOPY are statements which are used with the memory pages previously reserved. They will not be explored in this article.

The Program SUNDANCE

The following references are to the 16K Model I and Color Computer listings for Sundance, found later in this issue. N/A means that the routine was added to enhance the program. By referring to the appropriate manuals, a programmer should be able to get a good feel for program conversions.

Some Sources of Color Computer Programs

The following is a list of products which are presently on the market and have been received for evaluation:

Allen Gelder Software Box 11721, San Francisco, CA 94101, COCOBUG, Debugging Monitor for TRS-80 Color Computers (Software)

Datasoft, Inc 16606 Schoenborn Street, Sepulveda, CA 92343, Machine Language Monitor, Mini-Assembler, Dissassembler and Debugger (Software). Screen Edit Control System (Software)

Osborne/McGraw-Hill, 630 Bancroft Way, Berkeley, CA 94710, 6809 Assembly Language Programming (Book).

Computerware, Box 668, 1512 Encinitas Blvd., Encinitas, CA 92024, Power Pack (hardware, Color Diagnostics (Software), Color Editor (Software), Basic Lo-Res Games #1 (Software), Basic Lo-Res Games #2 (Software), Basic Lo-Res Games #3 (Software), Color Invaders (Software).

Radio Shack Pinball (Program cartridge), Quasar Commander (Program cartridge), Dinowars (Program Cartridge), Music (Program Cartridge), Skiing (Program Cartridge).

Though we haven't received any for evaluation, educators need to be aware of the large number of educational program (tutorial in nature, for primary grades) for the TRS-80 Color Computer, from Dorsett Educational Systems, Inc., PO Box 1226, Norman, OK, 73070.

As can be seen, conversion can be accomplished, but it takes time and possibly, as was the case here, reworking

the program logic. A programmer must analyze the existing program to the nth

degree and completely understand it before attempting conversion. It would be a good idea to draw a moderately detailed flow chart as an aid to conversion. Even then, conversion will not always be straightforward.

Line Numbers	for	Description
Color	Mod I	•
10-50	10-40	Remarks
60-130 Part of	f a routine at line	s 560-580
140-150	50	Clear memory
160-200	750-780	Sound routine
210	N/A	Set up color graphics
230-250	N/A	Draw unfolding sun
260-310	630-740	Assign variable values
320-330	N/A	The words "Score" & "Time"
340-360	N/A	Draw the word "Sundance"
370	N/A	Play opening theme (160-200)
380-480	790-1040	Introduction and instructions
490-510	1050-1080	Get number of suns
520	1080	Gogo subroutines which
670-1170	1990-2010	draws the grid and
860-900	2020-2070	selects sun locations.
530	1100	Draw Score and Time
540-550	N/A	Draw a red planet with ring
560-580	1110-1370	Main loop and movement - color program uses subroutine at lines 60-130 as well.
590,780-840	1490-2010	Redraw any disturbed grid
600-620	1380-1470	Test for pressed key and goto
910-930	see below	open grid
940	see below	No sun, close grid
950-980	see below	catch sun, play note, reset sun
990	see below	and close grid
1000	see below	add to score
1020	see below	and select replacement sun
910-990	1610-1970	routines for catching sun
1040-1170	1100	draw score and time remaining
1180-1290	2080-2270	end game routine

Figure 1	
Basic Keywords that are the same for both Level II and Extended Color	Basic

Commands	Statements	Functions	Operators
CLOAD	DIM	SIN	+
CLOAD?	END	SQR	-
CONT	STOP	TAN	*
CSAVE	GOTO	MEM	1
EDIT	GOSUB	PEEK	^
LIST	ONGOTO	POKE	=
RUN	ONGOSUB	POS	>
TROFF	FOR/NEXT/STEP		<
TRON	REM	Strings	>=
	IF/THEN/ELSE	ASC	<=
Input/Output		CHR\$	<>
PRINT	Functions	INKEY\$	AND
PRINTO	ABS	LEN	OR
TAB	ATN	LEFT\$	NOT
USING	COS	MID\$	k.
INPUT	EXP	RIGHT\$	
DATA	FIX	STR\$	
READ	INT	STRING\$	
RESTORE	LOG	VAL	
PRINT #-1	RND		
INPUT #-1	SGN		



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PMC-80/ MODEL I



MISSILE ATTACK

By the Cornsoft Group. New for the PMC-80. This program is a machine language imitation of the arcade game called Missile Command. This real-time machine language game (with sound effects) pits your twin silos of ABM's against a barrage of enemy missiles trying to destroy your cities. As your skill increases so does the difficulty of this ever popular arcade game! Watch the skies and may your aim be true. TRS or PMC-80, cassette, 16K \$14.95 TRS, disk, 32K \$20.95

TAPE COPY 1

©1981 S.S.M., Inc. New for the PMC-80. This program solves the problems that have plagued all PMC-80 owners. Problem: A machine language program will not load in the cassette player provided in the machine and you can't load a machine language program on the second cassette port. This is aproblem no more!: This program will load a machine language program from the second cassette player and saves it to the built-in cassette player. Loads and saves most TRS-80 readable tapes that load at 500 baud (the standard speed). MOD I or PMC-80.

Cassette only \$14.95

CONQUEST

©1981 by Lake Front Software. This program is based on the popular board game called "Risk" (The names have been changed to protect the innocent.) This game is for one or more people. It is a game that demands attack strategy and, if yours is the best, you will be the 'Lord and Master' of the planet. MOD I, III or PMC-80. Requires 16 K memory, cassette \$14.95

FLIPPY - Ver. 1.3

©1981 by J. Limkemann. This is a machine language program that plays "the best game of Othello on the TRS-80 that I have seen, and I play a lot of Othello" (Victor Andrews) MOD I or III. Requires 16K memory.

Cassette



COLOR



ANIMATED HANGMAN

Color. ©1981 S.S.M., Inc. This outstanding new program will thrill you for hours. He moves, groans and makes sounds. 16K.

..... \$12.95

DISASSEMBLER

Color. ©1981 S.S.M., Inc. This program displays hex on left side of screen and ASCII on right side of screen. For screen or printer.

Tust because I can sell something is not a reason for a product to appear in my ad; I must believe in it myself.

The following pages contain new items that I believe in. I am not after only one sale; I want return business, and that means I must give you quality products every time.

I believe I sell only quality products. If you have a problem, send your comments addressed to me. We support every product we sell.

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MODEL III BOOK



MOD III ROM COMMENTED

For the programmer that needs those answers about the MOD III ROM . . . Now! This is a complete list of locations in MOD III ROM and comments on each. All 14K of the ROM. There is no other book that gives you the detail this book has. Don't miss it. In order to respect Tandy's copyright the actual disassembled code is not printed, but the book is in a 3 ring binder format so you can put your own listing in between the pages for easy reading.

..... only **\$22.50**



MODEL III



TAPE COPY 2

New for the TRS MOD III. This program will load most TRS-80, 500 baud system tapes (standard MOD I speed) into memory then save it at 1500 baud on the MOD III. No knowledge of machine language needed. Now a way to backup programs that load at the slower speed. Makes cassette loading on your new MOD III a much faster and more reliable process. MOD III only, cassette \$14.95



MODEL I



TRS SUPER INVADERS

©1980 S.S.M., Inc. The closest TRS version of "Space Invaders" arcade game. MOD I with mono sound,

MOD I with stereo sound, disk only \$24.95

HYRES

©1981 by D. Lewandowski. This is a patch program for the programs called: Invaders Plus and TRS Super Invaders; so they can be run on the Programma Graphix-80 board. MOD I, cassette programs only \$9.95

CHAIN MAKER

[©] 1981 Steve Skindell. This program makes writing chain files on NEWDOS-80 a breeze. This is not only a program that creates chain files but it also is an editor of the file. A file can be removed from the disk and edited and saved back to the disk quick and easy. An outstanding program and a must for every NEWDOS-80 owner. Comes with complete easy to read manual. Purchaser must own NEWDOS-80 \$14.95

Written by J. Limkemann. ©1981 S.S.M., Inc. Bug + is a powerful machine language monitor. The one point most improved over other monitors, is the tape write. Bug + has the ability to write a "clean" tape (at 500 baud) this tape will read into the TRS-80 under the system command, without the problems previously associated with the volume setting. Regardless what version basic you have or whether or not you have a Radio Shack cassette fix, this monitor will improve the reliability of your cassette by 100%. There is also a verify command that works the same as also a verify command.

Finally a break point that works! When a break point is reached, there is a blinking astrick in the bottom right hand corner, you are able to see what is on the screen before the monitor takes control. Press the enter key the screen clears and the monitor comes to life. When you continue from a break point, the monitor will restore the screen first then load the CPU registers and return to your program. You do not lose your program or display, and it does work!

Bug + also has all the commands of T-Bug, they just work better. Bug + loads into low memory, then relocates itself.

Model I version plus it gives you the ability of reading or writing 1500 baud or 500 baud or 500 baud tapes. you can read at on rate and write at another. MOD I or III, 4K, both on same tape \$14.95



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POSTMAN DATA HANDLER

By Alger Software. ©1980 S.S.M., Inc. A machine language mailing list program that will do the following:

- 650 labels on a 35 track disk drive
- 750 labels on a 40 track disk drive
- 1534 labels on an 80 track disk drive
- 10 fields (2 user defined)
- Fast sorts (500 records in 30 seconds)
- Written for (1) drive system (capacities shown are for a single drive system)
- Most any label stock that is one up can be used (you save no money buying labels that are more than one up anyway)
- Print one label at a time or a sequence of labels
- Purge duplicates with or without user assistance
- 9 digit zip code

- Super fast search on any field - 3 second average

- Easy screen editing

Now Postman Data Handler has been upgraded with many new features. Now this very popular mailing package is not just the best way for most people and small businesses to do their mailing lists, but now we give you a way to uncramp, convert and formletter your mailing list. You need this package if one of the following is true: If your mailing package is memory dependent. This means that you must have more memory to handle more names in your machine; If you need a way to get rid of duplicate names in your mailing list; If you want to sort on more than just name or zip. (our package can sort on any or all 10 fields at once.); If you are waiting more than one minute for your sort to finish. (our package is in machine language so it runs very fast); If your present program will not handle

the 9 digit zip code; If your program doesn't have full screen editing. This package is a machine language program, this is the reason for the super fast speed of all functions!

This is a random access disk based program and any name can be called to read, write, print or update in 3 seconds or less. Now along with it you get utilities that permit you to do the following: CONVERT 1; takes all the files from your old mailing list and converts them to our system. (Why should you change to our system if we made the change hard?) CONVERT 2; convert from our package back to ASCII files if you want to do something with them (like send them to another computer over the phone). MOD I (coming soon for the MOD III). This program runs on all quality operating systems. Requires 1 disk drive ad 32K memory.

..... only **\$125.00**

Coming soon - MOD III version

MAILING LABLES 5000 \$14.95 Plus \$2.00 shipping

POSTWRITER

Special

If you purchase both Postman and Lazy Writer at the same time, at list price, (or if you already own one of the packages above and now want to purchase the other), we will at no extra cost include the Postwriter package FREE. There are 2 ways to purchase this package. The first way is to say "I want the best package on the market so send me the full system at one time". This includes the Postman Data Handler, Convert 1 and Convert 2. The package works on all quality operating systems based on the Tandy disk format (TRSDOS, VTOS, NEWDOS, NEWDOS-80, etc.)

\$250.00

This price is only good till June 1, 1981. Save \$49.95

If purchased separately \$299.95

GRAPHX

By Steve Skindell. ©1981. This is a program that is for the person who does reports or requires some sort of plotted output to show gains or losses, or any type of output that needs graphs. This program puts to the screen or to a printer the plotted points in bar graph format and plots the mean, and averages of input. This is a very important program for accountants, CPA's and the average businessman to evaluate, at a moments glance where he is, was, or where he is going. Files saved to disk can be recalled at any time to be reexamined, modified, or just reprinted. An extra feature: if you have the Microline 80 printer, by Okidata or Epson MX-80, your output is in true graphics. Information is supplied for the user so he can modify this program for other printers. Comes complete and ready to run. Requires MOD I or MOD III, 48K disk. Printer optional (132 col.) only \$49.95

SPECIAL – Receive this program for only **\$25.00** if you purchase an Okidata Microline 80 or 82 this month from us. Call for our low, low price.

MINI POSTMAN

Sample Package. For you people who have a small mailing list (max. 26 names) and/or you can't believe that Postman is the best package and we must be overstating how well this program runs; try our sample package called Mini Postman. It comes as an up and running program and shows you how good our package really is. This package can be upgraded to the full package within 30 days of purchase by calling and saying "I want the full package" and paying the difference between the mini and the full package. Note: Mini Postman does not include the convert utilities. If not everything you expect, return sample disk for full refund (less shipping). You can't lose.\$25.00

HARDWARE

MOD III Disk Drive Installation Kit

This is the complete kit to install your OWN Disk Drive into your own MOD III, with household tools. Complete installation manual.

The only thing you provide is your MOD III, your disk drives, and any MOD III operating system. About one hour installation time. **Shipping included.**

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LAZY WRITER Takes on Scripsit® by Radio Shack® and Electric Pencil®®

Has all the things that other word processing programs should have. Easy to use, written all in machine code. / It permits the inserting and deleting by characters, words, sentences, and paragraphs / Page scrolling up and down / Search ahead of the cursor or behind the cursor for any character / The cursor can be moved up, down, left and right / You can seek top of file and bottom of file / Block move of text, block delete of text/ Search and replace or search delete / Unlimited insert (to the limit of your machines memory) / Permits use with lower case /

Has things that other programs should have, but don't. Upper and lower case output to your printer (if your printer accepts lower case) without having your computer modified. ON UPPER CASE ONLY MACHINES: This program marks the capital letters so you can see which letters are CAPITALS and which are not. / Will change all upper characters text to lower case or all lower case to upper. A SINGLE COMMAND / Will capitalize the first letter of all sentences and all proper noun i's. WITH A SNGLE COMMAND / LOADS ANY ELECTRIC PENCIL / FILE. ASCII SAVED FILES, EDTASM FILES or BASIC PROGRAMS SAVED ASCII / Permits installing special control characters in your text for your printers special features, like double wide or condensed print / Definable s. sen length and definable print length to 255 characters wide / Screen editing that is not final till your command. This means that you can put one file on the screen and if you don't like howit reads you can cancel and leave it the way it was / You can append files (which means that you can put one file to the end of another file) / No lost characters at the end of the line, even for the fastest typist / A directory of all your files is available to the user without leaving the program / Saving programs to disk easy enough for the non-computer user / To save memory, not all the program modules are in memory at one time but are called from the disk as needed / You can set tab positions like on a typewriter / 10 CUSTOM COMMAND KEYS for the experienced user there is a command file that permits many special functions that are all user defined (not enough space for better explanation in ad. send for complete overview) / Program has HELP file that is a short review of the commands that are available /

Standard Printer Module. This printer module is provided for the user as a standard feature. Optional special printer routines for custom printer will be available in the near future. In this original release, it has the following printer drivers and will support the following printing devices: RS232, TRS232 and PARALLEL printer ports. You have the following format commands: Justifies Text, Centers Text, Centers Title, Line Spacing, Line Length from 3-255

characters and Set Margins / Also send any ASCII code to any printer from the text / Save formatted text to the disk for spealing later / Information for customer to load his own special printer driver / Printing can be stopped and started by the user at any time and then restarted where you left off / You can print entire file or just print to bottom of the page/ Communication Package. RS232 COMMUNICA-TION TERMINAL PROGRAM permits you to communicate with other computers. Transfer files from one machine to another. Permits dumping memory across the phone lines. Receive files from other TRS-80's and "Shake Hands" with larger computers. This is the complete system called LAZY WRITER. There is no package written for the TRS-80° that is as comprehensive. This package is available for the



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NEW FEATURES in Lazy Writer "The People Request, and David Welsh Delivers"

The system permits embedding ASCII commands into the text of the program. NOW you can do SUPERSCRIPT and SUBSCRIPT (if your printer can handle it). Underlining and boldface, printing of a single word in a paragraph, is now possible, at no extra cost.

A key that remembers the cursor position.

User definable special character. For use with printers that have printable characters that the TRS-80 keyboard does not normally support.

Margin control from within text. This means that you can change the margins of your printed text without stopping the printer routine and changing it.

Page offset with odd/even headers & footers. This means that you can print one page offset to the left of center and the next page offset to the right. This is very nice when you are writing a book.

Printing chaining feature. This permits having more than one file on disk and create one printed letter, contract, or book without having to reset the printer commands.

Mandatory space command. This is necessary when you are writing letters or papers that have certain words that are not to be broken-up, eg.:John P Andhouser. This name can be made to be unbreakable to justify routines in the program.

Disk catalog. Now you can load your disk directory into memory and create a file of this information.

Now loads Machine Language extention programs that are writen for Lazy Writer.

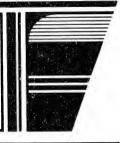


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SUPER UTILITY

©1980 by Kim Watt of Breeze Computing Inc. Sold on protected media only.

Main Program list:

Zap Utility; display sector (disk, file), display memory, compare disk sectors, copy disk sectors, verify disk sectors, zero disk sectors, string search, sector search, single or double density diskettes (if your machine works normally with double density).

Purge Utility; kill selected files, get disk directory, zero unused directory entries, zero unused granules, remove system files, kill by category, change name, date, password, auto command, change file parameters, remove passwords.

Disk Format Utility; standard format, format without erase, special format, read address marks.

Disk Copy Utility; standard copy with format, standard copy without format, special copy (to back up many protected disks) purchaser use - only for his own personal

Tape Copy Utility; this program is to make backup of many TRS-80 tapes, no matter how it is recorded (note again this program is for the use of the original purchaser for his own programs only).

Disk Repair Utility; repair gat table, repair hit table, repair boot, read protect directory track, recover killed files, check directory.

Memory Utility; move memory, exchange memory, compare memory, zero memory, test memory, input byte from port, output byte to port, memory to disk, disk to memory.

MOD I, protected disk only \$49.95 Back up copy available!

QUICK FIX

©1981 by Kim Watt of Breeze Computing, Inc. The sister program to Super Utility "the Grand Master" of utility programs, and has the ability to do all the things that have made Super Utility great, except: it does not have the following features; it doesn't have the Special Copy that backs up most TRS-80 readable protected diskettes, it does not have Tape Copy feature that copies many TRS-80 MOD I readable tapes, the Zap program does not go to double density diskettes, it does not have the Special Format feature.

Main Program List:

Quick Zap; display sector (disk, file), display memory, compare disk sectors, copy disk sectors, verify disk sectors, zero disk sectors, string search, sector search, examine address marks.

Quick Purge; kill selected files, get disk director, zero unused directory entries, zero unused granules, remove unused system files, kill by category, change name, date, password, auto command, change file parameters, remove passwords.

Quick Format: standard format, format with-

Quick Backup; standard copy with format, standard copy without format.

Quick Repair; repair gat table, repair hit table, repair boot, read protect directory track, recover killed files, check directory.

Quick Memstuff; move memory, exchange memory, compare memory, zero memory, zero memory, test memory, input byte from port, output byte to port, memory to disk, disk to memory.

The one extra feature it has is: you can put Quick Fix on all your diskettes. MOD I. On nonprotected diskete only \$34.95

OTHER THINGS from Kim Watt of Breeze Computing, Inc.:

[©]1980 AM Electronics. Written by Kim Watt. This program is for people who have 80 track disk drives and do not wish to keep that old 40 track drive just to load their 80 track system. Make 80 is loaded into your machine when it is placed in your 0 80 track drive, and the reset button is pressed. It loads automatically and asks for 35 or 40 track diskette. When you insert your diskette in the drive the program reformats the diskette so your 80 track disk system can read all of the information from the diskette without having to have a 40 track drive. This program works on standard NEWDOS, TRSDOS, NEWDOS-80 diskettes. Does not work on any disk that has any funny sectors (VTOS) or with the LOBO interface. 80 track disk only. \$14.95

SPACE COLONY

by Kim Watt. Space Colony is a space invaders type game for TRS 80 MOD I and with Programma Graphix 80 board. One level of play single player, with sound. MOD I, 16K Cassette \$14.95

CAPTURE/SYMON

By Breeze Computing, Inc. Capture is a 2 person game of Blockade for the MOD I. With sound this game comes alive with fast action. MOD I, 16K. Cassette \$12.95



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*TRS-80 is a product of Radio Shack, division of the Tandy Corporation

Soft Sectoring

Or

What To Do When Super Zap CHOKES

This program requires NEWDOS, TRS-80 Model I, a 16K Expansion Interface (Radio Shack Only), and one disk drive. The program will work on data disks as well as system disks in a one drive system.

Dan North Kansas City, MO

You never got around to making a backup of the program which you spent six weeks writing and now it won't work. It's a little late to think about the line filter you were going to get or the fingerprints you got on the diskette. Or maybe you put your disk too close to a magnetic field (like the top of your video monitor). So, load up SUPERZAP, one of the utilities supplied with Apparat's NEWDOS series of operating systems, and try to salvage it. To find the sector in which the error is located, execute a "VERIFY DISK SECTORS" command. Eventually, the track and sector number(s) of the offending segment(s) is displayed.

Attempting to display the sector or sectors will give an error message. After pressing ENTER, you may or may not see a typical display. If you try to modify that sector and if it doesn't work you have encountered one of a small group of disk errors which cannot be corrected by using SUPERZAP alone (unless you didn't remove the write protect tab). These errors are characterized by the message: "DRIVE X, TRACK YY, SECTOR ZZ TO BE WRITTEN IS UNREADABLE. SHALL IT BE READ PROTECTED", when SUPERZAP attempts to make a

change in that sector. The problem is not just with the data stored but with the way in which the computer locates that data area on the diskette.

There are two physical ways to sector a disk. One is hard sectored and the other soft sectored.

Hard sectored disks have a series of holes on the inner portion of the diskette, each marking the start of a sector. Timing is established by these sector holes passing by a timing hole in the diskette jacket.

Radio Shack, along with several other manufacturers, use soft sectoring. Soft sectored diskettes have one hole which passes a timing hole in the jacket each revolution. It marks the starting point of the tracks. To separate and identify each of the ten 256-byte data groups on each track there are 46 bytes of information. Those 46 bytes, located between each block of data, contain two spacing gaps, each consisting of 12 FF's followed by six 00's, and an ID Record.

The ID Record is located between the two spacing gaps and contains the track and sector numbers of the data which follows. Reading a track from start to finish would result in the string of bytes shown in Figure 1.

In general, reading and writing from the disk depends upon all of this information being present and correct. If it is not, read/write operations will terminate with an error message and corrections cannot be made using utilities like SUPERZAP.

The only time sector information is written (or repaired) in normal operation is when the disk is formatted. Of course, formatting the disk destroys all the data on it, which is not very helpful. What is needed is a program that will rewrite the sector information without affecting the data contents of the readabable sectors.

The program here makes four attempts to read each of the ten sectors of a track. If it can't read a sector it will display an error character "R" on the monitor before continuing on with the next sector. Then the data contents of each sector will be saved in memory. With all the salvageable data safely stored, the track will be reformatted. Finally, the sectors will be reloaded with the data which was stored in memory.

Although it is unlikely that running the program will be enough to fix a disk, it will make any remaining errors accessible to the SUPERZAP utility. While making repairs with SUPERZAP is not always easy, this program allows you to use the utility to its fullest advantage.

Because the program will, hopefully, not be needed very often, it has been made short rather than elegant. The program can be assembled using either Editor/Assembler or DEBUG. It has been named FIXSEC.

FIXSEC needs the number of the faulty track, which can be found using the "VERIFY DISK SECTORS" command of SUPERZAP. It is a good idea to write down the numbers of both the track and sector numbers for future reference. Once you are able to read and write to those sectors you will know where possible errors are most likely to be found.

To run the program, go to DOS READY, load FIXSEC and then enter DEBUG. Once in DEBUG, memory 7D02 must be modified from 28 to the faulty track number which SUPERZAP has provided in hex (no conversion is necessary). While still in DEBUG and before executing the program, put the disk needing repair in drive 0. Entering G7D00 will begin execution of the program.

If you are actually using the program on a bad track an "R" should appear in the lower right corner of the screen. This indicates that an error condition was encountered while reading one of the sectors. A "W" would indicate a bad write and should never occur unless the diskette is physically damaged; in which case this program will do no good. The program terminates by returning to DOS READY. Reloading SUPERZAP at this point will show that the previously *unreadable* sectors can now be read and modified easily.

FIXSEC is unlikely to damage data information if run on a good track. However, it will not stop when it detects an error condition. If any sector of a good track cannot be read within 4 tries it may introduce errors. If this

happens an "R" will appear in the lower left hand corner of the monitor. Finding the sector in which the error occured may be difficult. I have never had it happen and don't think it is likely. However, considering Murphy's Law and since it could cause significant problems, it should be mentioned.

Assembly programs which handle disk operations are a little more difficult than those only involving the Z-80 because the floppy disk controller chip must be given commands also. To make any sense of how this program works it is necessary to find an explanation of the disk controller chip. Two sources are TRS-80 Model I Disk Interfacing Guide, Bill Barden Jr (available from 80-Northwest Publishing Inc, 3838 S Warner St., Tacoma Wa 98409, \$5.95) and The Radio Shack Expansion Interface Service Manual, National Parts, Radio Shack, Fort Worth, TX 76101.

Armed with an understanding of the controller chip and the interface, you should be able to breeze through the program logic fairly easily. The only things that may seem out of place are the series of "EX HL". To understand them you have to examine the fine print in the controller description very carefully. After a command is issued to the controller chip the status of the controller cannot be reliably checked for 24 microseconds. Execution of "EX (SP),HL" four times provides that delay.

Hopefully, you will never need this program, but when the type of error that has been described does occur, it is the only solution that we know of. Whether you use the program or not, it contains all the necessary components for reading and writing to disk. I hope this sheds some light on how the disk works and why it sometimes does

```
Number of Hex value on
Bytes disk
```

2 FI

*12 FF First Gap

6 00

1 **FE ID Address Mark

1 XX Track Number

1 00

1 XX Sector Number

1 01 Sector Length

2 ?? Error checking bytes generated by the disk controller

12 FF Second Gap

6 00

1 FB Data Address Mark ***

256 ?? This is the Data

20 :: 11

2 ?? Error checking bytes generated by the disk controller

approx 80 FF to fill out the disk

Figure 1

^{*} The bracketed field is written 10 times once for each sector.

^{**} These seven bytes are the ID Record.

^{***} On track 11 which contains the Directory, the Data Address Marks are FA.

7D00 7FFF 7000 7D00 F3	00050 00060 00070 00080 00090 00100 TRACK 00110 BSTART 00120	ORG EQU EQU DI	32000 7FFFH 07000Н	;FIXSEC ;BY DAN NORTH ;
7D01 3E28 7D03 32FF7F 7D06 31FD7F	00120 00130 00140 00150	LD LD LD	A,28H (TRACK),A SP,7FFDH	; CHANGE BEFORE USING
7D09 3E01 7D0B 32E137 7D0E 21EC37 7D11 11EF37	00160 00170 00180 00190	LD LD LD	A,01H (37E1H),A HL,37ECH DE,37EFH	;FLOPPY ON ;CMD/STATUS REG. ;DATA REG.
7D14 3603 7D16 010000 7D19 CD6000	00200 00210 00220	LD LD Call	(HL),03H BC,00H 060H	;SEEK TRACK OO ;1 SEC. DELAY
7D1C CD977E 7D1F 3AFF7F 7D22 12 7D23 3613	00230 00240 00250 00260	CALL LD LD LD	BUSY A,(TRACK) (DE),A (HL),13H	;LOOP WHILE BUSY ;PUT TRACK TO DATA REG. ;SEEK TRACK
7D25 CD977E 7D28 3EO1 7D2A 32E137	00270 00280 00290	CALL LD LD	BUSY A,01H (37E1H),A	;LOOP TILL DONE ;CONTINUE DRIVE
	00300 00310 00320 00330			;;LOAD ALL SECTORS ;TO BUFFER AREA
7D2D 0600 7D2F 1604 7D31 78 7D32 32EE37	00340 00350 00360 LPB0	LD LD LD	B,0 D,4 A,B	SECTOR COUNTER SERROR COUNTER
7D35 48 7D36 OC 7D37 210070	00370 00380 00390 00400	LD LD INC LD	(37EEH),A C,B C HL,BSTART	;LOAD SECTOR REG. ;CALC BUFFER START LOC.
7D3A OD 7D3B 28O8 7D3D D5 7D3E 11OOO1	00410 LPB1 00420 00430 00440	DEC JR PUSH LD	C Z,FIN °DE DE,256	
7041 19 7042 01 7043 18F5	00450 00460 00470	ADD POP JR	HL,DE DE LPB1	
7D45 3E01 7D47 32E137 7D4A 3E88 7D4C 32EC37	00480 FIN 00490 00500 00510	LD LD LD LD	A,01H (37E1H),A A,88H (37ECH),A	;HL HAS BUFFER ADDRESS ;CONTINUE DRIVE ;READ A SECTOR
7D4F E3 7D5O E3 7D51 E3 7D52 E3	00520 00530 00540 00550	EX EX EX	(SP),HL (SP),HL (SP),HL	•
7D53 3AEC37 7D56 CB47 7D58 28OB	00560 LPB2 00570 00580	EX LD BIT JR	(SP),HL A,(37ECH) O,A Z,DONEB	;GET STATUS ;NO LONGER BUSY
7D5A CB4F	00590	BIT	1,A	

	28F5	00600	JR	Z,LPB2	;DATA READY?
	3AEF37	00610	LD	A, (37EFH)	READ A BYTE
7D61		00620	LD	(HL),A	
7062		00630	INC	HL	
	18EE	00640	JR	LPB2	
7065		00650 DONEB	PUSH	BC	;WE NEED AN EXTRA REG.
	3AFF7F	00660	LD	A, (TRACK)	; ERROR CODE IS DIFFERENT
	FE11	00670	CP	11H	ON TRACK 11 HEX
	0620	00680	LD	В,20Н	; ASSUME TRACK 11
	2802	00690	JR	Z,TR11B	; IF IT WASN'T TR11 THEN
	0600	00700	LD	в,00Н	;ERROR CODE=00
	3AEC37	00710 TR11B	LD	A, (37ECH)	GET STATUS
7D74		00720	CP	В	;WAS THERE AN ERROR
7075		00730	POP	BC	
	2808	00740	JR	Z,GOOD	
7078	20B6	00750	DEC	D	
		00760	JR	NZ,LPBO	
	3E52	00770	LD	A,52H	;ALL TRIES BAD
	32FF3F	00780	LD	(3FFFH),A	;LOAD "R"TO SCREEN
	1604	00790 GOOD	LD	D,4	
7082		00800	INC	В	·
7083		00810	LD	A,B	
	FEOA	00820	CP	10	;READ ALL 10 SECTORS
1080	C2317D	00830	JP	NZ,LPBO	
		00840			;
		00850			;REFORMAT TRACK
7000	7504	00860		4 04	;
	3E01	00870	LD	A,01H	
	32E137	00880	LD	(37E1H),A	CONTINUE DRIVE
	11EC37	00890	LD	DE,37ECH	; CMD/STATUS
	21EF37	00900	LD	HL,37EFH	;DATA REG.
7094 7096	3EF4	00910	LD	A,OF4H	;WRITE TRACK
7090 7097		00920	LD	(DE),A	
7098		00930	EX	(SP),HL	
7D99		00940 00950	EX	(SP),HL	
7099 709A			EX	(SP),HL	
	1600	00960 00970	EX	(SP),HL	05050000
	1E05	00980	LD	D,00H	;SECTORS 0-4
	0E02	00990 ·	LD	E,05H	;SECTORS 5-9
	CD8F7E	01000 LP0	LD CALL	C,2	;INITIALIZE ROUTINE
	36FF	01010	LD	DRQ	,
7DA6		01020	DEC	(HL),OFFH C	
	20F8	01030	JR	-	
	060A	01040	LD	NZ,LPO	al COD FOR 40 OFFITTING
	OEOC	01050 LP1	LD	B,10	;LOOP FOR 10 SECTORS
	CD8F7E	01060 LP3	CALL	C,12 DRQ	;12 FF'S
	36FF	01070	LD		
70B2		01080	DEC	(HL),OFFH C	
	20F8	01090	JR	NZ,LP3	
7DB5		01100	LD	C,6	•6 0019
	CD8F7E	01110 LP2	CALL	DRQ	;6 00's
7DBA		01120	LD	(HL),00H	
7DBC		01130	DEC	C	
7DBD		01140	JR	NZ,LP2	
			O 11	176 p L F G	

			,	
7DBF CD8F7E	01150	CALL	DRQ	
7DC2 36FE	01160	LD	(HL),OFEH	;FORM ID (ID AM)
7DC4 CD8F7E	01170	CALL	DRQ	•
7DC7 3AFF7F	01180	LD	A, (TRACK)	
7DCA 77	01190	LD	(HL),A	•
7DCB CD8F7E	01200	CALL	DRQ	
7DCE 3600	01210	LD	(HL),00H	;ALWAYS OO
	01220			. ;
	01230			;SECTORS ALTERNATE.
	01240			USE D IF B IS EVEN.
	01250			USE E IF B IS ODD.
	01260			;
7DDO CB40	01270	BIT	0,B	•
7DD2 2007	01280	JR	NZ,ODD	·
7DD4 CD8F7E	01290 EVEN	CALL	DRQ	
7DD7 72	01300	LD	(HL),D	
7DD8 14	01310	INC	D	
7DD9 1805	01320	JR	OUT	•
7DDB CD8F7E	01330 ODD	CALL	DRQ	
7DDE 73	01340	LD	(HL),E	
7DDF 1C	01350	INC	E	
7DEO CD8F7E	01360 OUT	CALL	DRQ	
7DE3 3601	01370	LD	(HL),01H	;SECTOR LENGTH
7DE5 CD8F7E	01380	CALL	DRQ	•
7DE8 36F7	01390	LD	(HL),OF7H	GENERATE CRC
7DEA OEOC	01400	LD	C,12	;12 FF'S
7DEC CD8F7E	01410 LP4	CALL	DRQ	• • • • • • • • • • • • • • • • • • • •
7DEF 36FF	01420	LD	(HL)_OFFH	
7DF1 OD	01430	DEC	C	
7DF2 20F8	01440	JR	NZ,LP4	
7DF4 0E06	01450	LD	C,6	
7DF6 CD8F7E	01460 LP5	CALL	DRQ	;6 00's
7DF9 3600	01470	LD	(HL),00H	•
7DFB OD	01480	DEC	C	
7DFC 20F8	01490	JR	NZ,LP5	
7DFE 3AFF7F	01500	LD	A, (TRACK)	
7E01 FE11	01510	CP	11H	;DATA ADDRESS IS
	01520			DIFFERENT ON DIRECTORY
7E03 3EFA	01530	LD	A_OFAH	;ASSUME IT IS TRACK 11
7E05 2802	01540	JR	Z,TR11	; IF IT WAS 11 DONT CHANGE
7E07 3EFB	01550	LD	A,OFBH	;IT WASN'T 11 SO A.M.=FB
7E09 F5	01560 TR11	PUSH	AF	PROTECT AF FROM DRQ
7EOA CD8F7E	01570	CALL	DRQ	•
7EOD F1	01580	POP	AF	
7E0E 77	01590	LD	(HL),A	;DATA ADDRESS MARK
7EOF 0E00	01600	LD	c,00	•
7E11 CD8F7E	01610 LP6	CALL	DRQ	;256 DA'S
7E14 36DA	01620	LD	(HL) ODAH	•
7E16 OD	01630	DEC	C	
7E17 20F8	01640	JR	NZ,LP6	
7E19 CD8F7E	01650	CALL	DRQ	
7E1C 36F7	01660	LD	(HL)_OF7H	GENERATE 2CRC'S
7E1E 05	01670	DEC	В	•
7E1F 208A	01680	JR	NZ,LP1	
7E21 11EC37	01690	LD	DE,37ECH	
			•	

7E24 1A	01700 LP7	LD	A, (DE)	;LOAD FF'S FOR REMAINDER
7E25 CB47	01710	BIT	O, A	STILL BUSY?
7E27 2808	01720	JR	Z,DONE	,
7E29 CB4F	01730	BIT	1,A	;DATA READY?
7E2B 28F7	01740	JR.	Z,LP7	, DATA READT:
7E2D 36FF	01750	LD	•	
7E2F 18F3	01760		(HL),OFFH	
7E31 00		JR	LP7	
1631 00	01770 DONE	NOP		•
	01780			;
	01790			;WRITE CONTENTS OF
	01800			BUFFER BACK TO DISK
	01810			;
7E32 0600	01820	LD	B,0	SECTOR COUNTER
7E34 1604	01830	LD	D,4	;ERROR COUNTER
7E36 78	01840 LPCO	LD	A,B	7
7E37 32EE37	01850	LD	(37EEH),A	;LOAD SECTOR REG.
7E3A 48	01860	LD	C,B	, LOAD SECTOR REG.
7E3B 0C	01870	INC	C	
7E3C 210070	01880	LD		
7E3F OD			HL,BSTART	
	01890 LPC1	DEC	C	
7E40 2808	01900	JR	Z,FINC	; CALCULATE BUFFER LOC.
7E42 D5	01910	PUSH	DE	•
7E43 110001	01920	LD	DE,256	
7E46 19	01930	ADD	HL, DE	
7E47 D1	01940	POP	DE	
7E48 18F5	01950	JR	LPC1	
7E4A 3E01	01960 FINC	LD	A,01	•
7E4C 32E137	01970	LD	(37E1H)_A	CONTINUE DRIVE
7E4F 3AFF7F	01980	LD	A, (TRACK)	CONTINUE DRIVE
7E52 FE11	01990	CP	11H	-UDITE COMMAND TO
1676 1611	02000	CF	110	;WRITE COMMAND IS
7E54 3EA9	02010	1.6	A 0A0U	;DIFFERENT
		LD	A,0A9H	;A5 FOR TRACK 11
7E56 2802	02020	JR	Z,TR11C	
7E58 3EA8	02030	LD	A,OA8H	FOR ALL OTHER TRACKS
7E5A 32EC37	02040 TR11C	LD	(37ECH),A	;LOAD CMD REG.
7E5D E3	02050	EX	(SP),HL	
7E5E E3	02060	EX	(SP),HL	
7E5F E3	02070	EX	(SP) HL	
7E60 E3	02080	EX	(SP),HL	•
7E61 3AEC37	02090 LPC2	LD	A, (37ECH)	GET STATUS
7E64 OF	02100	RRCA		, ==
7E65 300A	02110	JR	NC,DONEC	
7E67 OF	02120	RRCA	MOJOMEO	
7E68 30F7	02130·	JR	NC,LPC2	
7E6A 7E	02140	LD	A, (HL)	-DDO OCT OUTDUT A DVTC
7E6B 32EF37	02150			;DRQ SET. OUTPUT A BYTE
7E6E 23	02160	LD INC	(37EFH),A	
7E6F 18F0			HL	
	02170	JR	LPC2	
7E71 3AEC37	02180 DONEC	LD	A, (37ECH)	GET STATUS
7E74 FE00	02190	CP	00	TERMINATION WITHOUT
m-m /	02200		•	;ERROR?
7E76 280B	02210	JR	Z,GOODC	
7E78 15	02220	DEC	D	TRY AGAIN
7E79 20BB	02230	JR	NZ,LPCO	••
7E7B 32007F	02240	LD	(7FOOH),A	
				•

7E7E 3E57 7E80 32FD3F 7E83 1604 7E85 04 7E86 78 7E87 FEOA 7E89 C2367E 7E8C C32D40	02250 02260 02270 GOODC 02280 02290 02300 02310 02320	LD LD INC LD CP JP JP	A,57H (3FFDH),A D,4 B A,B 10 NZ,LPCO 402DH	;ALL TRIES WERE BAD ;"W" TO SCREEN
7E8F 3AEC37 7E92 CB4F 7E94 28F9 7E96 C9	02330 DRQ 02340 02350 02360	LD BIT JR RET	A,(37ECH) 1,A Z,DRQ	;WAIT FOR CONTROLLER TO ;REQUEST DATA
7E97 E3 7E98 E3 7E99 E3 7E9A E3 7E9B 3AEC37 7E9E CB47 7EAO 20F9	02370 BUSY 02380 02390 02400 02410 LPBUS 02420 02430	EX EX EX EX LD BIT JR	(SP),HL (SP),HL (SP),HL (SP),HL A,(37ECH) O,A NZ,LPBUS	;WAIT FOR CONTROLLER ;TO FINISH A COMMAND
7EA2 C9 0000 00000 TOTAL	02440 02450 ERRORS	RET END		

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Circle 64

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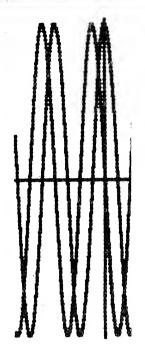
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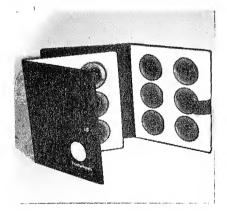
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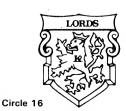




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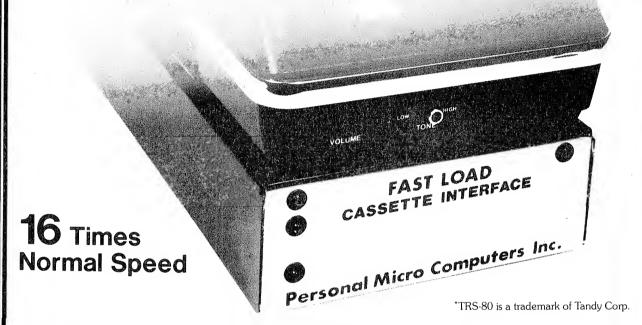
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FASTLOAD connects to the 40 pin I/O or to the Expansion box. The control program does not use computer memory because it is in a built-in PROM. Other valuable features are keyboard debounce program, automatic key repeat routine and keybeep via cassette speaker. Price is \$188.00 for FASTLOAD and \$95.00 for the modified CTR-41 recorder.

Personal Micro Computers Inc.

475 Ellis Street, Mountain View, CA 94043

(415) 962-0220

Circle 26

Lobo Drives International LX-80 Expansion Interface

and

Dual 8" Disk Drive Unit Evaluation

80-U.S. Staff

Opening them Up

Both units arrived well packed and undamaged. Our first impression was one of good design and beauty. Both the interface and drive unit, which contained two 8" Shugart disk drives, have metal cases which should preclude any Radio Frequency radiation problems.

"We experienced no rebooting, loss of data, or any other problems whatsoever with the LX-80."

The Manuals

The manuals are typical of most manufacturers incomplete. They simply assume too much on the part of the owner. The writing is vague and confusing in some areas (especially the drive hookup area). We had our 51/4" floppy disk drive cable reversed because the manual didn't point out that this cable goes on upside down. The only manual supplied with the drives is the SA800/801 service and maintenance manual from Shugart. It is our understanding that a five-page addendum is being supplied to assist in setting up the LDOS operating system with the LX-80. This addendum has three sections which cover some of the shortcomings mentioned.

The Test Installation

The test installation included the following configuration:

Exatron Stringy Floppy
Radio Shack 16K Level II Model I TRS-80
Lobo LX-80 Expansion Interface with 32K and two
RS-232 serial ports

Lobo 8202CX SA800 dual 8" disk drive C Itoh TEC FP-1500 Starwriter I Daisy Wheel Radio Shack 51/4" disk drive (Shugart 35-track)

The cost of the LX80 is \$799 without memory or RS-232 capabilities. However, the manual does mention the fact that an owner may purchase chip sets and install memory without having a service shop do it. Our configuration, with 32K and dual RS-232 ports, is \$1049. The dual disk unit is \$1579., with an additional \$50, for the disk cable.

Performance

During our tests, all equipment from Lobo performed better than expected. We experienced a typical windy spring day during the tests, in which the voltage of our power line fluctuated wildly. During this type of weather, the Radio Shack expansion interface would typically reboot. We experienced no rebooting, loss of data, or any other problems whatsoever with the LX-80. Credit that to a well designed and regulated power supply. If you take a look at the photos you will see the power supply of

the LX-80. The power supply of the disk drive unit is even more impressive.

The Exatron Stringy Floppy failed to initialize, and a quick phone call verified that the unit is not supported. While this is no big loss for most installations, the stringy floppy is a unit that should be considered while designing interfaces. It appears to be something that cannot easily be gotten around, as the LX-80 uses the empty RAM area between 3000H and 3FFFH for a ROM, which is the same area used by the stringy floppy ROM. Too bad.

The big news however, is the floppy disk controller. The 1791 chip, similar to the Western Digital chip used by Radio Shack, does a job on the older Radio Shack drives. We now have double density! The older drives have always been capable of double density and now there is no reason not to use them. With LDOS configuring the system, we can now get 568K (77 tracks) from each 8" drive and 152K (35 tracks) from each 51/4" drive. These figures are user space on formatted data diskettes. Total formatted space is 578K for 8" and 158K for 51/4", 35 track diskettes. The cost per byte for the total 1,183,774 bytes of storage on the 8202CX is \$0.001334 per byte. Adding the \$849 and \$1049 and \$50 for a total cost of \$3527., the cost per byte for total user bytes (1,222,064 memory and disk) comes to \$0.002886. A four drive Model II, in comparison, comes in at \$0.003301 per byte.

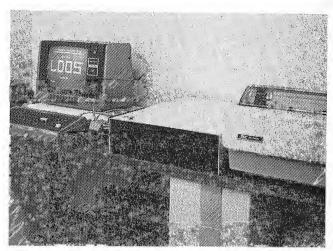
If you would use the maximum available in 8" drives - i.e., 8 double density, double sided disk drives - you could very easily achieve 9.25 megabytes of online disk storage.

We did not test the RS-232 ports in this unit, but expect they should perform better than Radio Shack's, as they are an integral part of the big board in the interface. For those with special needs in configuring the RS-232 ports, which are optional, they may be wired in any manner desired. As they come initially, they are not hooked up. There are two 24-pin jumper plugs in front of the serial connectors. These are removed and hardwired according to the user's needs. This eliminates the need for special cables in unique situations. LDOS can then be configured for baud rate, length, parity and so on.

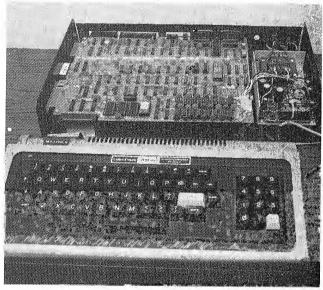
The LX-80 will support a hard disk in place of any one of the drives. We had none, and so this area was not tested.

Both the expansion interface and the dual 8" disk units performed as advertised. The quality of construction, hefty power suplies and other options available all speak of professionalism. With this equipment, the TRS-80 Model I is a very definite contender for a business installation. I would not hesitate at all to trust business software to this configuation.

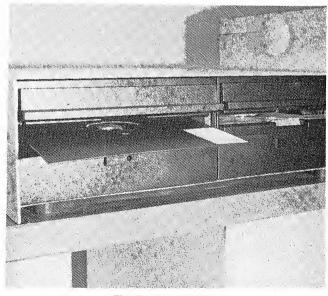
Indeed, Lobo has done an outstanding job and we feel the equipment is well worth the price.



Test Installation



LX-80 Uncovered - Note large power supply



The Dual 8" Drive Unit

ST80-III The Ultimate Communications Package:

Price \$150.00

This is our top of the line communication package. Full disk support including DOS commands have been implemented. ST80-III ™ has been on the market for over two years and has become the standard in TRS-80 " communication. This package has been used in a wide variety of applications including use with:

Addressomultigraph, Compugraphics, Spectrometers, and a wide range of Time-sharing computers.

CDC **IBM** ITEL Honeywell WANG Prime DEC Data General Amdhal **RCA XEROX** GE Apple Heath Northstar Altos Superbrain PET Cromemco HP 2000

The package includes the ST80-III management terminal program and nine other communication utilities: Fully documented with easy to follow instructions, ST80-III™ is by far the best terminal product on the market today. Features:

- 1) User configurable communication tables
- 2) Auto Logon
- 3) Last line repeat
- 4) Formatted video (Page, Scroll & Formatted)
- 5) Direct cursor addressing
- 6) File transfer from disk or to disk
- 7) Printer support
- 8) Echo, Feedback & Veriprompt ™ verifies data transmitted
- 9) 110 to 9600 BAUD support
- 10) Remote control of Memory open & close, Printer on & off, Video on & off & auto logon
- 11) Help display
- 12) User definable function keys

Host Communications:

Price \$ 50.00

This program is by far the best HOST program you can buy. It supports the PRINT and statement for the remote TRS-80™ running any of the ST80™ smart terminal programs. All of the ST80-III " advanced functions are supported by host allowing easy access via Basic, Fortran and machine language programs. Host features include:

- 1) User defined RS-232 port addressing
- 2) Definable BAUD rates from 110 to 9600
- 3) Definable break (yes/no)
- 4) Allow line feeds
- 5) Commands:
- a) Turn on RTS (request to send),
- b) Turn off RTS,
- c) Receive data only from terminal.
- d) Receive data only from host,
- e) Send data only to host,
- f) Send data only to terminal,
- g) Operate in duab terminal code,
- h) Operate in ST80 mode,
- i) Check CTS status. (clear to send)

This is a self relocating subroutine that can load anywhere in high memory.

Communications hardware available



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Requires 48K TRS-80 Mod I with 2 Drive & TRSDOS
Tested against Scripsit & Electric Pencil, should work with most word processors TRS-80. Scripsit are trademarks of Tandy Corp Electric Pencil is a trademark of Michael Shrayer Software



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P. 64.

FAST, REAL-TIME ACTION WITH SOUND



PINBALL

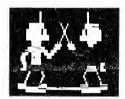
By John Allen

Get your flipper fingers ready for action in this real-time machine language game.

Lots of sound and flashing graphics make this fast action game so much like the real thing that you'll have to remind yourself not to shake your TRS-80.* Choose from five playing speeds to match your skill—but be prepared for a lot of practice if you ever hope to master the fastest speed.

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By John Allen



Fast machine language action game, with sound, from the author of the acclaimed "PINBALL"!

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By Carl Miller

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*TRS-80 is a trademark of Tandy Corp.

Circle 5

For TRS-80 Model I

YOUR next Operating System?

LDOS, from Logical Systems Incorporated (LSI) is another of the many DOS's that have recently appeared. LSI is a new corporation which was founded with the sole purpose of the creation and promotion of operating systems. Bill Schroeder, president and majority stockholder of the new corporation, remains vice-president of the Galactic Software division of GS & WS Incorporated.

An Upgraded VTOS 4.0?

This DOS has more misconception about it than any other. LDOS is rumored to be nothing more than an updated version of VTOS 4.0. This is

simply not true. While LSI did receive a license to use VTOS and LDOS does contain portions of the code authored by Randy Cook, the majority of this DOS is new code. This is evidenced by the 45 or so new commands and parameters beyond the VTOS configuration.

LDOS is the first DOS to make full use of the 1791-02 chip (compatible with Western Digital's 1791 chip) used in Lobo Drive's new LX-80 expansion interface (see preceeding article) which supports a mixture of 51/4", 8" and hard disk drives in a number of formats, including single and double density, single and double

Figue 1

Commands which are the same in both LDOS and TRSDOS

APPEND

CLOCK *

DATE *

LIB

LOAD

RENAME

TIME *

VERIFY *

* May be deleted from the operating system.

Figure 2
Output of the Library Command DIR

Free space= 0.0 K Drive 0 LDOS-5.0 -- 05/05/81

Filespec Attributes Prot / LRL #Recs / Ext File Space Mod Date

SSL/CMD	ALL / 256	44 / 4 S=	11.2 K	05-May-81
LBASIC/CMD	ALL / 256	28 / 3 S=	7.5 K	05-May-81
L/BAS +	ALL / 256	2 / 1 S=	1.2 K	05-May-81
PR23/JCL +	ALL / 256	1 / 1 s=	1.2 K	05-May-81
PR2/JCL +	ALL / 256	1 / 1 S=	1.2 K	05-May-81
SYSTEM/JCL +	ALL / 256	1 / 1 S=	1.2 K	06-May-81
FORMAT/CMD IP	EXEC / 256	17 / 2 S=	5.0 K	05-May-81
BACKUP/CMD IP	EXEC / 256	18 / 1 S=	5.0 K	05-May-81
CONFIG/SYS P+	ALL / 256	4 / 1 S=	1.2 K	05-May-81
BASIC/OVN IP	EXEC / 256	8 / 1 S=	2.5 K	05-May-81
PR/FLT P	READ / 256	4 / 1 S=	1.2 K	27-Mar-81
BASIC/OVX IP	EXEC / 256	10 / 1 S=	2.5 K	05-May-81
LOBO/DCT P	READ / 256	2 / 1 S=	1.2 K	05-May-81
PRPAGE/JCL +	ALL / 256	1 / 1 S=	1.2 K	05-May-81

sided and various track counts. What this really translates into is same size, same sided disks can be swapped between TRS-80 Models I, II and III, and some selected S-100 machines while operating under LDOS (as it becomes available for them). No one is doing that (NEWDOS80 for the Model III, perhaps, will allow Model I and III diskettes to be exchanged, but NEWDOS80 has not been configured for the Model II).

The production team for LDOS consisted of Bill Schroeder of Galactic Software as project leader, Roy Soltoff of Mysosis as systems analyst, and Roger Billings, Kirk Hobart, Chuck Jensen, Dick Konop, Tim Mann and Lance Micklus, as team members.

The Manual

The first thing about the manual is its completeness and readability. It comes in its own 11/2" D-ring binder with sheet lifter. This is all very good, but it would be nice to have indicies for the various sections (we understand these will be supplied in future editions).

The command syntax section of each instruction, be it library command, utility, or program section, is lacking in indication as which parameters are optional or unnecessary. While the text which accompanies each section illustrates the options, a quick glance just does not allow for a complete understanding of the syntax required.

Basic vs LBasic

LBasic is not included with LDOS. but is user created from Radio Shack Basic as contained on TRSDOS 2.3 in its original, unmodified condition. Should you be getting into disk use without any of Radio Shack's products, you will need to purchase TRSDOS 2.3 and the Model I TRSDOS/Disk Basic manual. The total cost should be less than \$21.00 from your local Radio Shack store. LDOS provides two patches which initialize LBasic without much trouble from Radio Shack's Basic.

LBasic occupies one to two additional K (1024 bytes) of memory in normal and block file modes, respectively. However, if a user program needs as much memory as can be allowed, LDOS supports Radio Shack Basic in its unmodified form and is the only DOS outside of TRSDOS to do so.

While LBasic doesn't add a lot of additional commands to normal Radio



(your dictionary, that is)

Now you can proofread and correct ten pages of text in less than one minute. with MICROPROOF dictionary software

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Shack Basic, the features are worth mentioning.

Upon entering LBasic, the operator may specify up to four options: 1) the number of file buffers to be set aside - default is three; 2) the highest memory address to be used by LBasic - default is that set by HIGH\$ (system); 3) an LBasic command, such as

RUN"MYPROG/BAS":

and 4) block file mode which allows file logical record lengths (LRL) to be less than 256 bytes - default is on.

LDOS Library commands, such as DIR, FREE, etc., may be executed directly from LBasic using the CMD"command" form and requires approximately 4K of free memory. The exceptions are those commands which modify the HIGH\$, or top of memory, location.

Four additional commands have been added to the CMD"" functions found in Radio Shack Basic: 1) CMD"O" turns off the [BREAK] key entry into the system debug utility; 2) CMD"P" sends the current screen information to the printer; 3) CMD"N" renumbers the current LBasic program in memory (see further explanation of this feature below); and 4) CMD"X" provides a variable and line number cross-reference utility.

Sequential and Random (direct) access files have been improved. You can now add directly to the end of a sequential file by using

OPEN"E",buffer-number,"filename" In random files,

OPEN"RN",buffer-number,"name" will open and create a new file. If one already exists, an error condition will be created, leaving error trapping options open to the programmer. Likewise.

OPEN"RO",buffer-number,"name" will only open an existing file, again generating an error condition if it does not already exist.

The other nice feature of LBasic is the block file mode of random files, which allows the use of more efficient file handling techniques through short record lengths as described in the "Files & Foibles" article of May/Jun 81, 80-U.S. Journal.

LBasic also upgrades the editor portion of Basic. You now may control listing functions with the up and down arrow keys and may enter the edit mode through pressing the commakey. [CLEAR] and up-arrow lists the

first line of a program while [CLEAR] and down-arrow lists the last. The period key will list the current line. Single character commands - L for LIST, E for EDIT, A for AUTO and D for DELETE - are supported.

The Line Renumber

The renumber function is a little different and may cause a few frustrations. Default increment between lines is 20, not 10. This is nice and allows for more space in inserting additional program lines. However, we grew up with 10 and prefer 10, thank you.

The LBasic program renumber will prescan for errors prior to actually renumbering any lines. If an error condition is encountered, no renumbering will take place. The command has an optional parameter to skip the scan for errors.

No matter what we did, we could not make this function misbehave. It would not allow creation for a program with line numbers out of sequence. If there are times you would wish to move a series of lines from one area to another of an LBasic program, resulting in lines that are out of sequence, this function will not allow it.

This Basic certainly doesn't have all the bells and whistles contained in other versions of Radio Shack Basic. But it does contain all the necessary elements to do a good job efficiently and effectively.

LDOS Library Commands

The commands in Figure 1 remain the same as TRSDOS. Abbreviations are allowed in many library commands. All of the library commands which are tagged with an asterisk may be deleted from the operating disk to allow for more disk space. The following commands have changed or are new to LDOS:

ATTRIB* - The syntax here is slightly modified and the KILL protection level does *not* allow re-ATTRIB. However, ALL and FULL (the same as ALL) do.

AUTO* - No syntatical changes here except the DOS-command may be up to 32 characters in length. With the addition of DO filename/JCL capability, full autoboot into any program is possible.

BOOT* - Though new, accomplishes the same thing as pressing the reset button if no key is held down during the reboot process. However, if one or two keys are held during reboot, it is possible for the system to bypass the SYSGEN configuration file, bypass the AUTO command file, enter the system DEBUG utility, or disable the keyboard debounce and key repeat function.

BUILD* - This new command to Model I TRSDOS is similar to the Model II and III TRSDOS in that an executable DO file may be created. However, in LDOS this file is a JCL (Job Control Language) file, complete with its own syntax. It is very complex and allows for such things as operator keyboard input, conditional branching and so on. In short, it is an additional language which is compiled and executed from LDOS. In addition, Scripsit may be used to both create or edit a source file created for this language.

COPY - This is a command which, in addition to the normal copy functions found in TRSDOS, will allow copying from a device (such as the keyboard, or RS-232 channel) to a diskfile or visa-versa, and also between devices. Also, in normal copy modes a LRL may be specified and an option called CLONE will duplicate the directory entry of the original file being copied.

CREATE* - This command is used to pre-create a file of a specified record length and size.

DEBUG* - This utility in the LDOS library now has extended features. The normal DEBUG utility is functionally the same as the one found in TRSDOS. The extended portion includes a block move feature, allows you to type data directly into memory either in Hex or ASCII format, fill a block of memory with a specified byte, and has a feature which allows you to read or write disk cylinders (tracks) to or from memory for modification. In addition, there are many other features of the extended version for comparing, execution and movement through the utility. Very powerful.

DEVICE - While this command has not changed, the output is considerably expanded over TRSDOS. Specifically, one can now see the configuration of each of up to eight disk drives and the disk contained therein on the Lobo LX-80 interface, or up to four drives with the Radio Shack interface. The logical drive number will be displayed with size, type (i.e., floppy or fixed), physical location on the cable, number of cylinders (tracks), density and number of sides of the last disk accessed in that drive, stepping rate at which the

drive is set, and time delay imposed between motor startup and access time on minifloppy drives. In addition, the keyboard, video and line printer devices, and their associated driver locations are given. Also information concerning a job log control device, source input device, listing output to a device and a user created device. In respect to this last information, it must be realized the LDOS is quite device independent and can therefore, be used to set up "real" and "Phantom" devices.

DIR - This library function is also expanded in LDOS. Figure 2 shows a typical expanded directory of a disk. No longer is space expressed in granules, but now in K. Also included is a Mod date which is the date the file was last written to (dependent upon having the correct date in the computer). Also note the "+" symbol, which specifies that a file was written to since the last backup. Nice feature. Note also, the level of protection is now spelled out in plain English. The DIR may be used to list only those files of a certain type or name.

The screen is not cleared prior to execution of the DIR. Display scrolling will stop every 15 lines (nice for big directories) or may be caused to scroll non-stop. Finally, the display may be sent optionally to a printer.

DO - This command executes a previously assembled JCL file (as under the BUILD command). Since the JCL is a language, we simply do not have the space to discuss it here.

DUMP* - This command is very similar to the TRSDOS command except that the dump may also be done in ASCII and terminated with a specified end of text marker.

FILTER - This powerful command allows for an I/O path through machine language filter (translator?). The manual's technical section explains this in detail and includes examples. With this ammunition, a machine language programmer should be able to write his own FILTER program. Two such programs are supplied with LDOS: PR and KSM. The PR filter allows configuration of the line printer. We have used it at 80-U.S. to produce the line listings in this issue. With it, we were able to convert the up-arrow (which prints as a left-bracket) into the carat character as well as specify line length, page length, and number of characters to indent on line wraparound (we use 2). The KSM filter allows for using a Basic shorthand with the keyboard which should be a real boon to programmers.

FREE* - This command is expanded slightly in LDOS and now displays the number of file directory entries still open, as well as the date the disk was created and the remaining free space in rounded K.

KILL - In addition to deleting a file from disk, this command can also kill (or cancel) a user created device.

LINK - With this command you may link together devices, such as the line printer and screen in either or both directions. You may also link to a diskfile through a phantom device created by the ROUTE command.

LIST - This command has been expanded to include a number of parameters not available from TRSDOS, including line numbering, setting tab expansion, starting at a specified line number, and output to a printer, all in ASCII mode; and a hexadecimal output where you may specify the beginning record number, the logical record length for display, or printer output.

MEMORY - This command allows the setting of top of memory, modification of a memory address, jumping to a memory address, and will return to the current top of memory address.

PROT* - In addition to the current TRSDOS options, you may also change a diskette name with this command.

PURGE* - In the words of the manual, "this command allows for 'controlled' multiple kills of disk files". Model II and III users will be familiar with this feature. Very handy for cleaning up a diskette.

RESET - This new command will restore all active devices and HIGH\$ to the normal values associated with those devices. HIGH\$ (top-of-memory) will be reset only if no background tasks are active (such as SPOOL, JKL, etc.).

ROUTE - You may now re-route I/O for a device or create a new one.

RUN - As a DOS command, this will load a machine language program and execute it. It is possible to do this on a single drive system from a data disk by using an optional parameter.

SET - This command sets a device to a driver routine, such as a serial printer driver or RS-232 driver.

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61 Lake Shore Road, Natick, MA 01760 (617) 653-6136 SPOOL - This command will establish a first-in, first-out (FIFO) buffer either in memory or on disk for a specified device such as a line printer.

SYSTEM* - This command will allow for setting system parameters for CPU speed (if you have a clock speed-up kit); disabling the break key; creation of a blinking cursor; specification of drive type, speed, and number; setting up the JKL function, including optionally sending graphics to a supporting line printer; loading the lower case driver; setting up a type-ahead feature; and finally configuring the disk to automatically set up your parameters upon BOOT.

TRACE* - This command will display the Program Counter address and is hardy for running and debugging machine language programs.

XFER* - This command might best be called the single disk owner's COPY command. It does *not* require LDOS to be present on either disk used.

The Utilities

The Utilities included with LDOS are those necessary. While we missed an editor/assembler and disassembler, it would only be a loss to programmers using those tools.

As mentioned earlier, LDOS requires all disks to be formatted prior to use, as *none* of the utilities will automatically invoke this feature. Keep this in mind as we go through the utilities.

BACKUP - This utility is self prompting for the uninitiated or those who don't like to type in a bunch of parameters. It will allow complete duplication (even to the way the directory was written), partial backups of files in a "controlled" environment, or not having a system disk resident in drive 0. If you read the DIR information, you will note that updated files are flagged. It is possible, therefore to BACKUP ONLY THOSE FILES with this command. However, be aware that backup will not stop if there is already information on the disk. Only on disks with different pack ID's, will the operator be given the opportunity to abort the BACKUP under certain conditions.

The utility will allow for BACKUP between different disk sizes and densities and if more files exist than the destination disk will hold, the operator will be prompted to mount additional formatted disks until everything has been backed up.

CMDFILE - This is LDOS's answer to LMOFFSET and appears to be much more complete as it allows not only tape-to-disk and disk-to-disk manipulation of machine language files, but also disk-to-tape. In addition, two files may be appended; a single file may be offset with an optional driver routine to disable such items as clock interrupts and the keyboard debounce routines of TRSDOS, LDOS, or NEWDOS; a file may be appended with a patched code to correct errors in a manner similar to the PATCH utility described later; SYSTEM cassette tapes may be created from non-contiguous blocks of memory; and the load address range and entry point or transfer address may be displayed and printed. This utility is self-prompting and the manual is exceptionally clear and complete, even to the inclusion of explanations of the appendages.

FORMAT - This utility is completely self-prompting and allows for input of optional parameters including diskname; master password; disk density (if your controller supports it); number of sides (a two-sided disk is treated as a single-sided drive by LDOS); number of tracks; and the stepping rate if the disk is to be used in drive zero during boot. Eight-inch drives will always default to 77 tracks regardless of the parameter passed.

LCOMM - This utility is a complete terminal package allowing keyboard send/receive; spooling of a line printer through a dynamic buffer; file transfer between systems and so on. It is a very large utility and must be treated separately to be appreciated. It may be used in conjunction with KSM and other features of LDOS.

PATCH - This utility is common to the Model II TRSDOS and serves the same purpose here. It is used to make minor changes or corrections to existing disk files.

Other Features

LDOS includes an RS-232 driver for use in configuring the RS-232 serial port(s) in expansion interfaces. The KSM filter allows the use of files containing pre-defined phrases for direct keyboard entry. The PR filter is used to format the data sent to a line printer, including: addition of a line feed after a carriage return, number of characters per line, issuance of a HEX OC instead of a series of linefeeds for top-of-form, number of characters to

be indented on wrapped around lines, number of lines printed per page, page length in lines, setting of left margin, character translation and expansion of HEX 09 tab characters.

The JCL is contained in its own portion of the manual. It is our understanding there is a tutorial being prepared to aid in the use of the JCL feature of LDOS.

The technical section of the manual is quite inclusive for machine language buffs who want to explore disk operation. It includes many calls and routines, as well as explanations of features unique to LDOS.

The LDOS disk contains patches to Scripsit and Electric Pencil. The Pencil patch causes Pencil to honor HIGH\$ (top of memory) and to use the standard keyborad driver and the KSM filter. The patch may be read by Pencil and modified should the user want part or all of the features added.

The Scripsit patch forces it to use the active printer driver, honor HIGH\$, corrects a stack problem and adds a "Q", or "Query" DOS directory command. It does a couple of other things which are fully explained in the remarks section of the file. Again, as in Pencil, Scripsit can read the FIX file.

Conclusion

Without a doubt, the outstanding feature of LDOS is the manual.

If one uses only Radio Shack Basic, LDOS has to be classified as one of the easiest to use DOS's. LBasic with the preceeding "L", confused those not used to it.

The solid support in the form of a very responsive group on the other end of an 800 number helps tremendously. By the same token, don't expect help if you pirated yourself a copy.

At 80-U.S., LDOS has become a real workhorse, since it fully supports any unmodified TRSDOS based programs and allows for printer configurations available only previously as special driver programs.

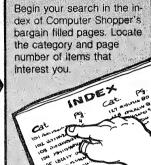
Evaluating this (or for that matter, any other) DOS is difficult at best. We worked with it for over two months and have yet to fully exploit all its virtues. If you do get this DOS, put away all your other operating systems (as we were forced to do while using the LX-80) and give it a chance. We believe you will come to the same conclusion - LDOS is indeed the state of the art in operating systems.

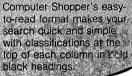
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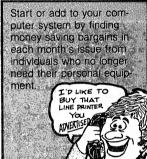
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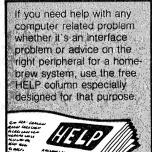




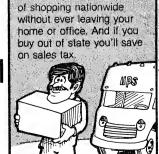


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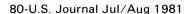














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Here's Joe Sysop, hacking away at the keyboard of his magnificent, spectacular, colossal, better-thanany-other-in-the-world computerized bulletin board service (BBS). Bleary-eyed, I type away on my Electric Pencil, formulating files, allocating space and consecrating disk drives, all in the hopes that my board would soon be up and running.

So begins the saga of Aggravation-80, the first CBBS to ask the question, "Can I ever get this thing on-line??"

It began innocently enough. I bought myself a modem and a copy of Omniterm, an excellent Smart Terminal program, and then began dialing up semi-local CBBS's like the Forum-80 in Nashua, New Hampshire. At the time my phone bill was around thirty dollars a month. I was bitten by the bug.

Next, I visited Richard Taylor (at his new Programs Unlimited retail store) to check a program called Message-80. I received a program, loosely known as Connection-80, which is a carefully formulated BBS with a special electronic mail order section designed to curb hunger at my house through the sale of a few bits and pieces of software. Written by Richard Taylor (his talents know no boundaries) and Tom Vandestowe, of the Microperipheral Corporation. His

imagination is vast and besides, his auto-answer modem was in stock. Now, I figured that my board had a fighting chance.

Arriving home from New York, I discovered that my new 40 track MPI B51 disk drive had arrived from Level IV. Since I'd had no trouble with the other MPI drives purchased from them, I expected none from this one. With my brand new, un-backed up BBS software in drives zero, one and two, and with the doors open for safety, I hooked up drive three. ZAP went the software.

I could've just spit.

I called Level IV on the phone and pitched a fit. It was the middle of the evening and I figured that the \$%'&() drive had munched my disk in some sort of death throes of its own. I was wrong. It was the idiot installing the drive who'd caused the trouble, namely, me.

Chuck Chesseldine of Level IV listened to my piteous cries and then asked if I had Super Utility, a disk utility from Breeze Computing which no disk system user should be without. I said I did. Together, by long distance, we repaired my disk and un-munched my precious programs.

Meanwhile back at the board, we struggled for several hours to put Magazine-80, as we called it, on line.

Almost instantly a flood of well wishers began to sign on at a rate of about one per hour. The last of which was none other than the most illustrious and personable Larry Kelley, Sysop Extraordinare, and proprietor of * M O M * (Modem Over Manhattan), otherwise affectionately known as Maniacs On Modems. Larry left a most kind message of welcome and greetings, signed off and took the entire Bulletin Board back to Manhattan with him. I just sat there, staring in disbelief as three 51/4" Verbatim diskettes packed their little suitcases and went west in a cloud of shattered magnetic particles, waving bye-bye, as they departed.

Arrgghh! I felt like Charlie Brown at the kite-eating tree. My new BBS blinked "READY FOR CALL" three times and died.

But Joe Sysop never says die! Once again I redumped my shattered program, this time from a backup, which had been thoughtfully placed in reserve by my roommate and assistant Sysop, Jamie Tietjen. Again we were up and running. That was five o'clock on a Friday. At 6 PM someone up the road (rumor has it) (allegedly) took a pair of 36-inch bolt cutters to a long distance phone trunk.

For three days after that the phone ceased to exist...

Despite all the trials and tribulations, Aggravation-80, that crashing, frustrating, complicated collection of misfit hardware and software; became Magazine-80, a clean running, smooth and satisfying specialty Computer Bulletin Board Service with features the creative writing efforts of many New Hampshire area computerists.

Being a Sysop takes patience. It's not for the easily angered. It also takes (in most cases) a dedicated system and a dedicated phone line. The software involved is available in a variety of places.

Bill Abney's Forum-80 is very popular and seems to be the most widespread of the TRS-80 BBS programs. The rules are strict here, however, and the formats most rigid, except for the local features section, which seems always to include downloading. There are no fees involved for the software but I suspect that getting a Federal Grant for research on the mating habits of

vegetarian Aardvarks is easier than getting licensed to operate one of these.

Richard Taylor's Message-80, the base program for my Connection-80, is inexpensive at around \$150 and very flexible as to which modifications can be made to it. I concentrated the theme of my board around program reviews (which I have in the most abundance), short stories, poems, and a BBS edition of Captain Eighty. Richard's reaction to these modifications was an enthusiastic (but dignified) go for itl

Along the course of becoming a Sysop (and it is an honor to be declared such by those who already are), I have discovered a whole world of new personalities. It is not unlike that which CB radio used to be back in the sixties. Everyone is a friend and has a stake in the order of things.

It's an eerie feeling to sit passively by while someone from the other side of the country takes control of your computer, your brainchild, which you have nurtured through power failures and bouts of Shrayer's revenge. But it's all worth it when he's read your articles, downloaded the only public domain program in New Hampshire, and leaves a messager for you and everyone to see: "NICE BOARD, WELCOME". That's a true, pure, natural high.

Here's Joe Sysop, in the twenty-third hour of a marathon attempt to log on to every Bulletin Board in the country. There is a wrecker pulling into my driveway. It is painted in Bell Telephone colors. It's hooking up to my van. WAIT A MINUTEII

My connection to ALOHA-80 in Honolulu is complete. I log on.

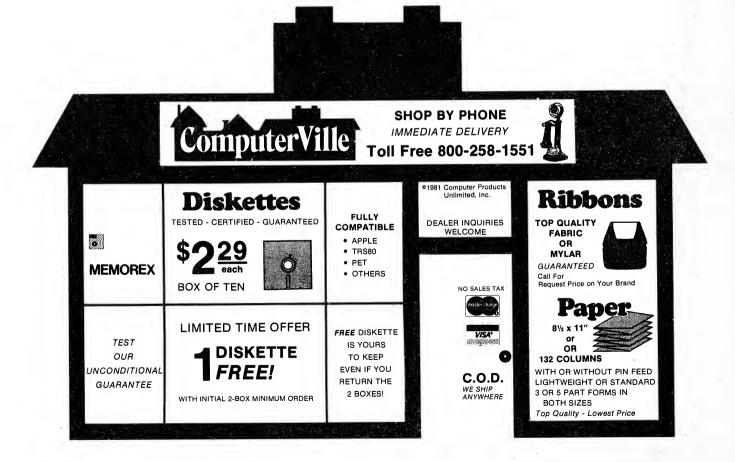
"Don't take my van!!" I cry in vain. "What's a three thousand dollar phone bill among friends?"

ALOHA-80 dumps me off for lack of a password.

The sun goes behind a cloud.

Somewhere a pair of bolt cutters lurks in the shadows.

It's going to be one of those days.



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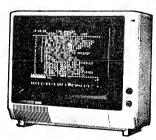
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@NEWS

(Stringy Floppy Owner's News)

By Jim Perry

This issue's column was typeset directly from my original Electric Pencil files. By using a special interface program I was able to drive a \$65,000 CRT Autologic micro 5 typesetter. The machine belongs to a company in Anaheim, California, called Pacesetting Services. In a future column I will give details of how anyone with a Stringy Floppy (or disk system) can get typesetting done this way, it's very fast and quite cheap.

FMS Modifications

Joe Carrier has made some modifications to the File Management Program, and now gets page titles and numbers plus marks every 66 lines. The marks enable you to use roll paper, and easily cut it to put in a normal binder.

These modifications only affect the X command, the existing P (Print) command is unchanged. Line 20 is modified, line 4000 is replaced and six new lines are added.

20 CLS:PRINTTI; "COMMANDS

```
- ADD", "J - JUSTIFY", "R - RANGE
A - ADD", "J - JUSTIFY", "K - RANGE
C - CHANGE", "L - LIST", "S - SORT
D - DELETE", "M - MAF", "T - TOTAL
E - EXTEND", "N - NEW", "V - VALUE
F - FIND", "F - PRINT", "W - WRITE
H - HIDE", "Q - QUIT", "X - TITLE, PAGINATE & PRINT
"CL;
685 IF PEEK(16425) >= 61 AND Q="X"
     THEN GOSUB 5000 : GOSUB 4040
705 IF Q = "X" GOSUB 5000
4000 INPUT"TITLE OF TABLE"; TT$:
       Z1=40-((.5) LEN(TT$));
       EE=1:LPRINT STRING$(80,"-")
4035 GOSUB 4040: GOTO 600
4040 POKE 16425,0: FOR E1 = 1 to 5:
       LPRINT CHR$ (138): NEXT E1:
       LPRINTTAB(Z1)TT$
4065 IF EE>=2 THEN LPRINTTAB(37)"PAGE";EE
4070 FOR E5 = 1 TO 2: LPRINT CHR$(138):
       NEXT ES: RETURN
5000 FOR E2 = 1 TO 66 - (PEEK(16425)):
       LPRINT CHR$(138):
       NEXT E2: EE = EE + 1:
       LPRINT STRING$(80, "-"): RETURN
```

Lots of Machine Language

When trying to @SAVE large machine language programs you can run into problems, if the end address is above **7FA6** on a 16K machine. If the end address is below **7FA6** then the procedure given in the owners manual will work successfully, otherwise you can use the following technique - developed by Dr Lichen Wang.

Determine the start, end and auto execute addresses for the program. If the end address is above **7FA6** then the Stack of a 16K machine would be wiped out, type in the following BASIC program:

```
10 FOR I = 16421 TO 16425
20 POKE I,0
30, NEXT I
40 POKE 16802,240
50 POKE
        16803,195
60 POKE 16804,151
70 POKE
        16805,25
80 POKE 16548.38
90 POKE
       16549.64
100 PDKE 16633,40
110 POKE 16634,64
120 POKE 16561,161
130 POKE 16562,65
140 CLEAR O
150 QLOAD2
```

Do not run the program, yet. Save it as file 1 onto a wafer long enough to hold both it and the machine language program.

Delete line 150 (@LOAD2), and execute the program. Now load your machine language program from cassette, but **do not** execute it. Go back to BASIC, then @SAVE the machine language program as file2 on the wafer.

To load the machine language program use @LOAD1.

BASIC Bondage

When chaining BASIC programs, as described in the owners manual, you may run into the same problem that Ronald Hartloff from Puyallup, Washington, did. His letter follows:

Upon calling up a second program I have found that the data was destroyed. After repeated attempts at chaining and experimenting, I have found that the second program must not contain a CLEAR statement. It seems that since the chained program automatically executes it wipes out all data with the CLEAR statement. Removal of the CLEAR statement cured the problem.

Since a CLEAR statement can't be used by the second program, sufficient space must be CLEARed by the first program for all subsequent programs. This has made it impossible for me to chain the Radio Shack Cassette Portfolio program, on my 16K machine. The size of the initial program is so large, if I CLEAR enough space for subsequent programs an Out of Memory error is produced.

I am presently experimenting with the possibility of resetting the Variable Pointers with POKE statements, thus providing additional space without destroying stored data. An alternative would be to divide the initial program into two programs, one for stocks the other for bonds. I will let you know how successful I am in the future.

Stringy Strings

To follow on from Ronald Hartloff's caution about CLEAR statements, *Wee Willy* sent in some information about String Variable data.

When passing String Variable data from one program to another you may get into trouble, unless you take some precautions. Unless the String Variable gets put into the String storage area, it will not get passed to the next program. The rules for this are as follows:

If a String is set as a constant in a program, for example:

```
10 A$ = "Hello"
```

Or if it has been READ from a DATA statement, it will remain in the BASIC program - not in the String Storage area. By using the VARPTR command you can take a look at the location of any String, in this example VARPTR(A\$) would point to an address in BASIC.

When a String is entered as the result of an INPUT statement, such as:

```
10 INPUT "Name please"; A$
```

Or when the String has been concatenated (anybody know how to pronounce that word?), such as:

```
10 A$ = "Hello" + "there"
```

Also when a String is defined as a CHR\$, like:

```
10 A$ = CHR$(65)
```

The String will be placed into the String storage area, and be available to a following chained program. If you try these examples, and then use VARPTR, the storage address will be in the String storage area.

Sometimes you are confronted with the problem of defining a String as a constant, but wanting it in the next program. A simple solution is to concatenate it with a null String:

```
10 A$ = "Hello" + ""
```

This will put the String where you want it, but not change it. In a future column *Wee Willy* has promised to give a simple program for examining memory, and seeing the VARPTRs change 'before your very eyes'.

Improved Wafers

If you've had any problems with wafers, such as the tape pulling out, then send them back for replacement. A small batch of rogue tape slipped into the production line, it was slightly thicker than it should have been, and has caused some problems. The tape now used is the correct thickness, and new moulds have been designed for the wafer housing. So if you have any wafers that have suffered the dreaded tape pull-out send them to Exatron for exchange.

Extended BASIC

ESF Extended BASIC is a new program, written by Tom Wheeler of Missouri, that makes your Stringy act like a slow disk system. New commands that are recognized by Extended BASIC include CMD'l' (formats a blank wafer, and puts a clean directory file in place), CMD'D' (displays a directory of files on the wafer), CMD'DL' (directory, with file lengths), SAVE'PROGRAM/EXT' (allows you to save a program by name, with an extension) and LOAD'PROGRAM/EXT'(the reverse of SAVE). Other new commands include GET, LOF(N), EOF(N) and KILL'PROGRAM/EXT'.

With these commands you can easily emulate a disk system, and use random acess techniques to manipulate data. Programs can be chained together (one program can load another, and run it), and you can even assign passwords to programs. As a bonus there is a command called LINE, which produces sound out of the cassette port. With it you can specify both the frequency and duration of the sound (LINE Frequency, Duration).

Complete with a 24 page manual ESF Extended BASIC is priced at only \$25.00. The only drawback that I have found is that some machine language files overlay the ESF Extended BASIC area, but this can be worked around. A very good program.

Color Memory

If you have a TRS-80 Color computer then Exatron has some good news - a 32K memory expansion box for \$199.00, plus a disk controller interface for an additional \$99.00. Details were still being finalized as I wrote this, so if you are interested give Exatron a call on 800-538 8559 (in California 408-737 7111).

Next Column

Next time around the Electric Spreadsheet review, no room this month, and more tips from owners. My @NEWs address has changed to P.O. Box 1681, Upland, California 91786, write and let me know what you would like to see in future columns.

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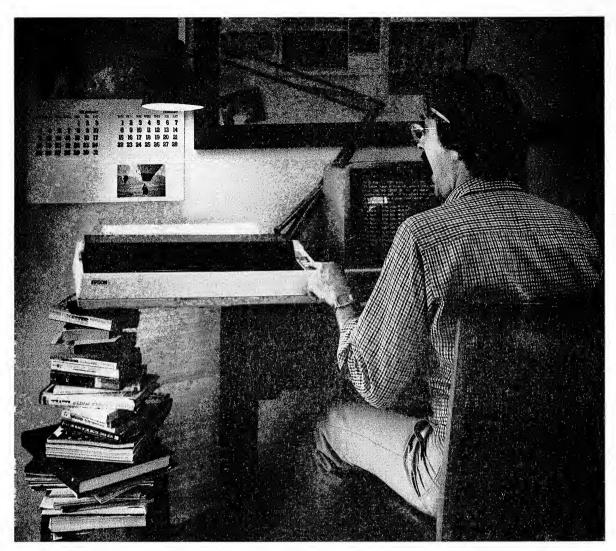
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Needless to say, the specs on this machine — and especially at under \$1000 — are practically unbelievable. But there's something about the MX-100 that goes far

beyond just the specs; something about the way it all comes together, the attention to detail, the fit, the feel. Mere words fail us. But when you see an MX-100, you'll know what we mean.

All in all, the MX-100 is the most remarkable printer we've ever built. Which creates rather a large prob-

lem for those of us at Epson.

How are we going to top this?

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THE PROGRAM STORE



By Wall & Moncrief from Adventure Int. By wall & Moncret from Adventure int.
Calling this program simply "LUNAR LANDER" is like calling the Space Shuttle an "AIRPLANE" -- they are so much more than the names imply! And like the Space Shuttle, this great simulation will get used again, and again, and again...

Moving across your screen is a vast lunar landscape, graphically depicted in both long range and close up, with many choices for landing sites. Choose a more difficult site and get more points -- if you can land successfully. You have complete control of your LEM via main engines and small side thrusters, and a successful landing is heralded with a flag raising ceremony. Great graphics and sound add to the realtime challenge and fun.

16K tape...\$14.95 32K disk...\$20.95



A unique and challenging space game that uses the computer, playing boards, tokens, and two players to manage galactic empires. You must travel through space, seeking alliance with friendly planets, while knowing that your opponent is competing for the same planets and may wage war at any time. Add to this the "normal" pratfalls of interstellar travel and you have a most exciting game, in-

16K, includes 2 Starmaps, 308 tokens, rule book, program listing and tape...\$14.95





By Hogue & Konyu from Big-Five "The rage of the arcades" is now available for TRS-80! Exciting sound effects add to the action as the invaders swoop down to destroy your base. Even while you have your hands full battling the aliens, you have to watch out for the Flagship! Super graphics, super Super graphics, super action, super fun!

Level I or II, tape...\$14.95

TRS-80 Level II 16K unless otherwise noted

WORD WARS

By Hernhuter & Taylor from Acorn This two-game package combines sound and graphics to provide hours of fun for all ages. Both games can be played against the computer or as two-person games.

WORD CHALLENGE depicts the length of a phrase. The phrases are either computer generated or typed in by your opponent. The player's challenge is to figure out the phrase, based on the letters guessed.

WORD GAME allows many levels of strategy as you try to guess the letters of a mystery word. The strategy comes in because each letter has points based on its frequency of use in English language, and you are told how many points the mystery word contains.

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FLIGHT SIMULATION

From Sub-Logic The wait is over! If 3-D graphics seem impossible on the low resolution TRS-80, you haven't seen this brilliant program. During FLIGHT SIMULATION, you instantly select instrument flight, radar, or a breathtaking pilot's-eye-view. But be sure to strap yourself in -- you're liable to get dizzy!

Once you put in some air time learning to fly your TRS-80, head for enemy territory and try to bomb the fuel depot and airstrip while fighting off five enemy warplanes. Good luck!

Level I or II protected tape...\$25.00



From Programmer's Guild Imagine finding an old sailing vessel -the ocean floor, but floating silently on calm seas. What would you do? The options are all yours in the fascinating new adventure that combines excitement, suspense and terror on the high seas. Does your fortune run to buried treasure -- or a watery death?

16K tape...\$14.95

Or try these other P.G. Adventures: Death Dreadnaught \$14.95 Thunder Road \$14.95 Dragonquest \$15.95

Honestly ...

With so many good programs available, it is hard to choose among them. Our solution is to try to stock them all, but that doesn't solve your dilemma. So, we will regularly offer this column of straightforward comparisons of sim-ilar products. Since everyone has different needs, we hope to give enough information to help fill yours. We strive to present factual comparisons of features; the opinions offered are purely subjective, however. If our opinions offend any authors or publishers...



AMAZING BLACKJACK MACHINE

Not a blackjack playing game, this program uses your playing and betting attracties to play hands automatically -- at up to 2000 hands per hour! It also allows testing yourself on the playing of difficult hands. The betting yourself on the playing of difficult hands. The betting strategies, both built-in and user defined, are based on point count systems developed by Edward Thorp and refined by Lawrence Revere (the built-in tables seem to be based on Revere's book, "Playing Black) peck as a Business"), Business", and while it doesn't allow such subtleties as "in and while it doesn't allow such subtleties as "in and while it gives fair leevay in defining or and "surrender," it gives fair leevay in defining or and "surrender," it gives fair leevay in defining or and "surrender," it gives fair leevay in defining or and the playing and counting, some outside reading is essential to get the most from this program.

16K Tape...\$19.95

BLACKJACK MASTER

With four operating modes, BLACKJACK MASTER acts as tutor, high speed betting and playing simulators, and computerized dealer. It deals hands from four "decks" using casino rules. While you cannot customize the bee a problem for the average are casino, this should not bee a problem for the average are casino, this should not hackjack dealers we've seen. It allows splitting pairs, doubling, insurance and surrender. The two simulator options let you define betting and playing strategies, but do not allow point-counting. Insurance and surrender are not supported in these high speed modes. The computer plays the chosen number of hands and reports the outcome. The "tutor" drills you playing decisions based on the dealers "up" card.

The program should aid in developing good basic skills for casual blackjack playing. The 60 page manual is useful to novice through expert.

CASINO BLACKJACK/COUNTER

ADIRU DLAUNALM LUURIER

From Manhattam Software

This program comes closes: to being a pure blackjack
dealing game, but vith useful differences. You choose
the number of decks (1,2 or 4) and the dealer's opeed
(useful in training for quick caaino decisions and
point-counting). Cards are dealt to five players. The
computer plays four hands; you play the hand in the
middle. Splitting, doubling, and insurance are supported, but surrender is not.

On your request, the program will tell you the current point count and recommended bet size. Documentation
is adequate, but requires outside reading if you wish to
learn point-counting.

learn point-counting. 16K Tape...\$14.95 32K Disk...\$19.95

WIN21

WIN21

By Phil Pilgrim from Discovery Bay
While it can be used just for fun, WIN21 is designed
as a serious learning tool. It lets you define the number of decks dup to four), how many hands you will play,
you, and the bandwerplayed hands on either side of
you, and the bandwerplayed hands on either side of
you, and the bandwerplayed hands on either side of
exprogram lies in your ability to exercise various options
for betting, counting, and playing; You can let the
computer do some of the functions while you work on
others; the computer can instruct you in some or all of
the functions; it can just point out errors in your
play; or it will leave you alone (but will score you
based on how you bet and play). The only weaknesses are
and in not supporting the
find in not supporting the
full, but sophisticated option).
The psetage includes Dr. E. Thorp's book, "Beat the
Dealer," which is a little dated but still quite valid.
If you are willing to practise, the program can teach
you to be an excellent player.

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DECATHLON

By Timothy Smith from Microsoft
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utilized in this marvelous series of programs.
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COSMIC FIGHTER

By B. Hogue & J. Konyu from Big Five Terrific sound, graphics and unique challenges mark this new space game a winner! While fighting off the alien convoys, each more skillful than the last, you must keep track of your rocket fuel or risk explosion as you maneuver toward your space station. Can you dock immediately, or is the station overrun by aliens? Find out by ordering Cosmic Fighter today.

16K Tape...\$14.95 32K Disk version...\$17.95

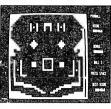
PROJECT OMEGA

By Bob Nicholas -- Adventure International In probably the most accurate simulation ever produced for a microcomputer, you are responsible for the production, finance, health and well-being of Project Omega, the Earth's first deep space colony.

Painstakingly researched, Project Omega will provide much enjoyment and satisfaction as you overcome the frustrations and obstacles of taming an uncharted environment. The tape version is for one player; the disk version supports one or more, plus a special tournament option.

16K Tape...\$14.95 32K Disk...\$24.95

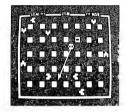
PINBALL



By John Allen from Acorn Get your flipper fingers ready for action in this real-time, machine language game.

Lots of sound and flashing graphics make this fast action game so much like the real thing that you'll have to remind yourself not to shake your TRS-80. Choose from five playing speeds to match your skill. Can you beat your friends' scores? Will you avoid the dreaded "Bermuda Square?" Get PINBALL today and find out.

Protected tape...\$14.95 Protected disk...\$20.95



ATTACK FORCE!

By B. Hogue & J. Konyu from Big Five Unlike the usual space "shoot-em-ups," your ship is not tied to the bottom of the screen. In Attack Force, you use the arrow keys to control both speed and direction as you maneuver all over the screen in search of the alien Ramships and Flagships. A realtime, machine language game with amazing graphics and sound.

You have to be quick to avoid the enemy ships that warp down on you, and the Flagships' lasers can fire in all directions — even diagonally! And don't look away for an instant, because one of the alien spacecraft might be transformed into a mirror-image of your own!



By Infocom from Personal Software In Zork, the Great Underground Empire, unearthly creatures guard 20 treasures. Bring all the treasures back to the trophy case and you can leave alive! You must pick your way through intricate mazes, collecting objects that may help or hinder you in your quest. But keep your wits about you, because in Zork, they take no prisoners!

TRS-80 or Apple II, 32K Disk...\$39.95

The state of the s

BASKET BALL

By John Allen from Acorn You have to be fast to keep up with the action as you try to outscore your opponent in five minutes of one-on-one basketball. Compete against a friend or your computer.

Steal the ball, duck around your opponent and slant toward the basket for a lay up! The graphics are based on a 3-dimensional depiction of a basketball court, and ball dribbling sounds add to the realism.

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JUST ANOTHER PRETTY DOS?

If new LDOS were just another disk operating system (DOS), we would not recommend it to you. However, two differences make this system unique and important: customer support and user benefits.

When you buy any DOS, you need service for programming assistance, updates and tips on how best to use its features. This is part of what you buy with LDOS. First, you will be supported by a toll-free phone line listed on your registration card. Second, you will be promptly notified of all updates and may send your original diskette to a service center for updating. You pay only the cost of return mail you can do it every week if you like. Third, a regular newsletter will inform you of any updates and provide tips on using some of LDOS's many special features.

With LDOS you get a well documented, thoroughly tested, and powerful DOS. The publisher is committed to a professionally written and detailed users' manual. Besides contracting with some of the best microcomputer systems houses for technical and customer support, a highly regarded technical writing firm is doing the manual.

The power of LDOS is its ease of operation, its independence of hardware configuration, and its device independence. You can make selected backups, chain together a series of programs and operations, and operate several different types of drives from the computer. LDOS has all the features of VTOS 4.0, fully implemented and working. There are hundreds of reatures which we do not have room to mention, but the best features are its ease of use for the new disk owner combined with its sheer power potential for the expert. We will gladly send you more information on LDOS if you just call our toll free number.

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DOSPLUS 3.3

Pete Carr Port Orange, Florida

In the Jan/Feb 81 issue of 80-U.S. Journal, we compared NEWDOS80 and VTOS 4.0 Disk Operating Systems (DOS) for the Model I TRS-80. If you look back at the summary in that article we described a "dream DOS" which would contain certain features of NEWDOS80 and VTOS 4.0 in one system.

DOSPLUS 3.3D has most of the features wanted, is easy to understand and use, and is dependable. It's from a company in Hollywood, Florida, called Micro Systems Software.

At the time of this writing, Micro Systems Software is offering two DOS's: DOSPLUS 3.3 (single density), and DOSPLUS 3.3D (the D stands for double density). In actual use the commands and features are basically the same for both. We will be discussing both versions here, except where noted.

An earlier version of DOSPLUS, 3.1, was reviewed in the Nov/Dec 80 issue of 80-U.S. Journal, and did not have all the features of 3.3. Owners of the earlier version can obtain the latest version and manual by returning the original disk and manual to the manufacturer.

To use DOSPLUS 3.3D, you have to buy a product from Percom Data, called the *Doubler*. It's cost is about \$220.00. It is an add-on board that you install inside the expansion interface which gives you almost twice as much disk storage space. It is easy to install; you just plug it in. With the doubler you can keep using your old single density program disks as well. If you need more disk storage for your Model I business data/files or programs and don't want to buy the new TRS-80 Model III to get it; this definitely offers you an alternative.

Note: Your disk drives must be tracking precisely and be in perfect alignment to use double density. When first received, the doubler caused a lot of problems when formatting and saving programs. No problems at all in single density. Percom told us it was probably the floppy disk drive and alignment. Some disks seemed to work better than others. A new AEROCOMP 80 track drive formatted and saved programs very reliably. Your disk drives may work great in single density, but double density is much more demanding and requires precision alignment of the drive heads. Percom does offer a resistor and read/write head modification that will make older drives work more reliably in double density. If you have problems, and are using quality diskettes, the disk drive is probably the culprit. (As of this writing, both Percom and LNW have just started offering new double density modification kits for the Radio Shack interface and are said to be less critical. The new LNW mod does seem to overcome earlier problems experienced with the older Doubler from Percom. We have not tested the Doubler II.)

What's really great about DOSPLUS is that it will read, write, DIR, FREE, etc., your old single density disks along with your new double density disk. The new Model III under TRSDOS won't do that. With DOSPLUS you don't have to learn new commands to use single or double density disks. You just insert the double density version in drive 0, then insert any disk (single or double density) in your other drives and you are ready to go. DOSPLUS takes care of the rest. For example, to FORMAT a disk in drive 1, you just enter "FORMAT:1". No need to use any special syntax.

DOSPLUS 3.3D comes with a 19 page user guide. It isn't the most complete manual, but it does clearly explain how to use the system and all its features. It is a user manual, not a technical manual, and it assumes that you already have the TRSDOS manual. Micro Systems has indicated that they will start shipping a more complete manual with DOSPLUS very soon.

DOSPLUS was available before Model III DOS, so it is not a copy or modified version of it, though it is similar. Both DOSPLUS and the Model III TRSDOS borrow heavily from the Model II TRSDOS.

DOSPLUS's BASIC's

There are two Basics included with DOSPLUS at this time. They are completely rewritten in Z80 code instead of the older 8080 code, which makes them more efficient in time useage and memory. One is called "BASIC" and the other "TBASIC" (Tiny Basic). The general difference is that with BASIC you are allowed to execute any system program or command from Basic (DISKZAP, DIR, FREE, CLRFILE, FORCE, etc.) and return to Basic, or your Basic program, and continue execution. The syntax for this is CMD"command". If you want to return to DOS from Basic, just enter "CMD"; no need to enter CMD"S", like the other DOS's.

Like the Model II, Basic does not allocate any user files unless you specify them when you load Basic. If you are going to use disk data files you must use the form "BASIC -F:3". This would allocate 3 buffers for your data files. A more extended form is "BASIC program -F:3 -M:61000", where the machine will load Basic, allocate 3 files, set memory size to 61000, and run the Basic program.

With TBASIC you have all of the regular Basic features available, but you cannot use any CMD''DOS command''. The error messages are also shortened ("SYNTAX ERROR"="SN"). For this sacrifice what do you get in return? Over 40,000 bytes of free user memory for your programs with a 48K computer. It depends on what you are doing and what your needs are as to which one (BASIC or TBASIC) would be the best. One possibility is to write your programs with BASIC, then run them using

TBASIC and take advantage of the extra memory available for arrays and string space. Both Basics are compatible with Radio Shack (Microsoft) Disk Basic.

The end of a sequential file may be written to with the OPEN"E" command and the OPEN"D" command is like the Model II Basic (the command is identical to OPEN"R"). Logical record lengths less than 256 bytes are also supported. After you write a random file program using shorter record lengths you will not want to go back to the old cumbersome way of having to sub-block your files for the 256 byte buffer. DOSPLUS automatically lets you use shorter record lengths or the standard 256 byte record. You specify which type of file you want to use in the BASIC OPEN statement:

OPEN"R",buffer #,1,"filename",record-length

DOSPLUS Basic has a shorthand edit feature that goes beyond the rest. The usual R for RUN, L for LIST and A for AUTO are included. But even nicer is L"Program name" for loading a program; S"program name" for saving a program and R"program name" for loading and running a program.

The DI and DU commands allow Basic program lines to be moved from one place to another and duplication of program lines. The RENUM (for renumbering a program) and REFERENCE (for getting a variable and line reference table) functions are also included.

TRON allows single stepping through a program; TROFF turns off the function. These may be inserted into a program to aid in its development. Another command, CMD''M'' - variable map command, will display currently defined variables and their values. Used with TRON this is a very powerful feature.

CMD"SR" will Search and Replace anything in your program, such as changing all PRINT commands to LPRINT.

If the statement,

RUN"program name",V

is encountered in a Basic program, all currently defined variables will be saved for execution with the program being called and run.

Finally, Basic allows LPRINT TAB to a value of 255.

DOS Commands and Features

As DOSPLUS claims in their advertisements, it operates very smooth and fast. "Overall", DOSPLUS is the fastest operating system I have seen.

Automatic lowercase keyboard detection is supported. This means that if you have a keyboard with lowercase capability, DOSPLUS will automatically detect it and support the lowercase within the DOS. Also, a block cursor and automatic key repeat is supported from powerup.

Keyswitch bounce from the earlier keyboards is eliminated with this DOS. The vendors claim that they have found a new routine for this which no one else uses, and guarantee that no TRS-80 keyboard, old or new, will ever have a keybounce problem with their DOS.

DOSPLUS also supports a screen print command. Anytime you want to print the information on the video to a printer, you may do so. And if the printer is

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not ready, control is returned to the keyboard. It will not hang up. Also, you are allowed to stop (BREAK) the screen print function at any time.

BUILD and DO commands allow you to make a file of command lines which, for example, from power up will load Basic, set memory size and number of file buffers, and then load and execute a Basic program.

The DIR and FREE commands are the most useful of any Model I system we have used. The FREE command, like the Model II and III, maps disk space availability, which tracks are locked out, and where the directory is located. The DIR gives you the usual information as well as free space in K (approximately 1000 bytes) and Grans. In the DIR routine, you have the option of pressing the space bar to scroll a file at a time or to press ENTER which will scroll up a full page. This is very useful when using a double density disk, as there are more programs and files on it. Of course, the output of either the directory or the free space map may be sent to the printer.

In addition to DIR and FREE, DOSPLUS also has a command called MAP. This powerful feature returns, among other information, the locations of each file, the beginning and ending location for each segment, and so on.

The PURGE command allows you to kill off unwanted files from a disk fast and efficiently. What is different about DOSPLUS is the RESTORE command. If you accidentally kill or purge a file, you can get it back by simply typing "RESTORE filespec". After you do this, the directory will show it has indeed been restored. An extra feature is "DIR (D)", which will show you all deleted files in the directory which is a real aid with the RESTORE command.

The TRANSFER command will copy your files from one diskette (single or double density) to another diskette. While it will not transfer system files, you may specify the invisible file (I) option to transfer those. It is also great for moving all of your single density files to a double density diskette or vice versa.

The FORMS command allows you to control the parameters of your printer. It allows for paper length in lines per page, number of printed lines per page, and number of characters to be printed on each line.

The FORCE command is like the ROUTE command supported by VTOS and Model III. It supports the devices, *DO=video, *PR=printer, *KI=keyboard, and allows you to route whatever normally goes to your screen to your printer or vice versa.

The CONFIG option allows the system to be set for specific needs. The number of tracks, disk head stepping rate, number of sides, and high speed/reverse video if your system has it may be specified. Also the number of drives may be configured into your system.

Execute only protection for Basic programs is supported through the use of the DOS command ATTRIB. The program will now run, but it cannot be listed, edited or tampered with in any way without knowing the password you have assigned to it. The break key is also disabled but may be left enabled if wanted.

CLEAR allows the memory to be zeroed above

6000H. After this command is executed you may be sure of not having any unwanted data or garbage in memory.

CREATE allows you to create a file and preallocate space for that file. Preallocating file space will speed up file write time because the DOS does not have to periodically allocate more space on the diskette.

CLRFILE will clean a data file out without having to delete the file. Once a file is zeroed, however, the data cannot be recovered even with the RESTORE command.

BACKUP will work with either a single or multidrive system.

DATE and TIME may be called from DOS as well as Basic. You can also set it from Basic with the command, CMD''TIME 03:30:00".

The FORMAT command allows you to specify single or double density, the number of tracks and the rest of the information needed. There is a difference in the way this utility is executed as compared to other operating systems: The other DOS's will move the disk head all the way back to track 0 before verifying the disk. DOSPLUS starts at the last track formatted and works its way back to track 0. It appears to be faster. It certainly is more logical. Also, since most tracks which have a tendency to be bad are on the inside of the disk, this will locate them first. Very nice job!

DISKDUMP is not anything like Radio Shack's Diskdump. It allows you to display and modify a disk file or program. Once DISKDUMP is loaded, the disk head will be positioned at the beginning of the specified program. Then, with the aid of the repeating key capability, you can scan backwards or forwards through the file.

Included with DOSPLUS is a great program called DISKZAP. It allows you to specify how many tracks a disk has that you want to edit, display sectors, modify sectors, zero files, copy tracks, print tracks, verify and format disk, or even format just one track if you want. It is generally comparable to other programs of this type, but being able to work with single or double density makes it really nice.

Summary

Yes, we are impressed with DOSPLUS and Micro Systems Software. They are a very new and fast moving company that has demonstrated a knowledge of what people need in systems software. Using DOSPLUS has been a pleasure especially without having to insert any fixes or patches to keep it working. There have been no bugs or errors attributable to this system. It is super fast, efficient, easy to understand, logical to use, and still offers most of the power and flexibility of the other DOS's.

What few shortcomings are limited to the lack of technical information in the manual (we understand this is being worked on), and the fact that some machine language programs will need patching to operate. But, you can still continue to use most of your favorite and proven Model I programs.

If you want a fast, reliable operating system, DOSPLUS 3.3D and 3.3 (single density) are highly recommended.

FEATURES:

- 1) Radio Shack compatibility
- Error free variable length records
- Full lower case detection and support
- Repeating keyboard with NO keybounce EVER
- Shift [0] typewriter keyboard option
 Execute only protection feature for BASIC programs
- Automatic track support for 35 through 80 track drives (mixed)
- Device I/O handling with FORCE command
- Supports high speed clock modification (up to 4.0mhz)
- 10) Supports mixed mode (single & double density) automatically
- 11) Allows disable-enable of break key
- 12) Allows user to define step rate per drive and re-configure system disk
- 13) Allows for efficient use of double-headed drives
- 14) Built in screen printer (shift [CLEAR]) with [BREAK] key abort 15) Multiple command chaining with "DO"
- 16) Built in memory test with CLEAR command
- New printer driver which allows complete forms control and paging
- 18) Automatic serial printer driver with optional auto linefeed
- Execute any DOS command from BASIC and return to BASIC
- Free space map of diskette with optional output to printer
- Copy with variable length files
- Complete RS232 control from keyboard with status check
- Create and pre-allocate files from DOS
- Display current date and time from DOS
- More information from Directory with optional printer output
- 26) Enter DEBUG with shift [BREAK] to allow use of [BREAK] from BASIC
- 27) New DISKDUMP/CMD sector display/modify program (works with filespecs)
 28) New DISKZAP/CMD single/double density disk editor
- 29) New BACKUP (more reliable, no more pack ID check)
- 30) New FORMAT (more reliable, no need to bulk erase disk first)
- 31) New MAP utility (maps out disk, showing where files are located)

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- Shorthand features for editing (listing and editing with single key)
- CMD"M" instantly displays currently set variables
- Global search and replace in BASIC text
- Line printer TAB to 255
- 9) OPEN"E" to end of sequential file (for output)
- 10) DI (delete and insert text line)
- 11) DU (duplicate text line)
 12) "',R" & ",V" options after LOAD and RUN (files open & save variables)
 13) OPEN"D" allowed (Model II compatible) equal to OPEN"R"
- 14) DOS commands from BASIC
- 15) Automatic, error-free variable length records
- 16) Single step execution with TRON (fabulous for debugging)
- 17) CRUNCH (BASIC program compressor)
- 18) New TBASIC (tiny BASIC) offers full BASIC commands
- 19) TBASIC and DOSPLUS together only use BK of RAM (40K left in 48K TRS-80)

DOSPLUS comes complete with full utilities, PLUS a FREE patch to enable Model I Scripsit/Super Script to run on Model III UNLIMITED Backups!

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- Crunch (Basic program compressor)



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Descending Lower Case



Larry Panattoni

Lower case video and Model I may seem like an old subject, but I recently made an improvement to mine at a minor cost of \$19.95. Because more than half the Model I owners I know have not yet obtained the "official" Radio Shack lower case modification, I would like to share this latest improvement and discuss some additional possibilities.

The Model I was not designed for lower case letters but it is capable of providing them with a slight modification. During the early months of the Model I's introduction, a doit-yourself modification (not approved by Radio Shack) was made popular by the introduction of the fine word processing program, the ELECTRIC PENCIL.

A great number of owners implemented this simple modification. It consisted of adding an eighth video memory chip for bit D6 (missing from the original design) and a toggle switch for switching back to the standard all upper case letters.

The demand for this word processing program and its modification caused Radio Shack to provide their own official versions: SCRIPSIT and the lower case modification.

Lower Case Modifications Compared

There are pro's and con's regarding both the modifications. First we will explain the drawbacks of each, then show how we eliminated one of them in the do-it-yourself modification.

The Radio Shack modification received mainly two complaints, neither of which are substantial.

First, some older programs would not run properly with the modification installed. Even though we have a program that doesn't, we believe such to be few in number. If Radio Shack would have included a toggle switch, those would have been compatible. By now, all new commercial programs are compatible.

The second complaint was cost: \$99 originally, slightly less since it first came out. In response to this, labor plays a part and is expensive. In addition to the added memory chip, an excellent lower case driver is provided. And, you receive a new Video Character Generator (VCG) which allows the tails of some lower case letters descend below the base line, which the original VCG did not do.

The drawbacks to the do-it-yourself mod are several. First, it voids the warranty.

Second, you must provide your own lower case driver. Third, the video display of some lower case letters looked odd because the original VCG did not allow the tails of the g, j, p, q and y to descend below the base line. See chart 1. Correcting this problem is the latest improvement to this to-it-yourself mod.

The Video Character Generator

All characters except graphics are burned into a ROM which we have called the VCG. It is this VCG which Radio Shack replaces during their modification. My early attempts to purchase this VCG from Radio Shack proved futile. However, there recently appeared an outside source for a ROM which appears identical to theirs. It sells for \$19.95.

It is a popular notion that the VCG displays a 5 X 7 dot matrix character. This is only partly true. The actual output is a 6 X 8 matrix, with one column always blank to provide horizontal spacing between letters and one row blank for vertical spacing. See charts 1 and 2.

The Model I designers apparently felt the width of one dot was not enough between rows, so they used a hardware circuit to blank four additional rows between each of the sixteen lines of characters on the display. Of the five dot positions separating each row, only one is controlled by the VCG. It is this one horizontal blanking row which allows the improved lower case characters.

Chart 1 shows the complete set of characters which the original VCG is capable of displaying. The four blanking lines caused by the hardware circuit, as mentioned earlier, are not shown. Notice the first row and column are always blanked out. These are the horizontal and vertical rows which allow for horizontal and vertical character separation.

This configuration puts the base line of each character on the bottom row (eighth dot), allowing no room for descending letters which creates odd appearing g, j, p, q and y's on the screen.

Chart 2 shows the complete set of characters which the new VCG produces. The horizontal row used for vertical separation is now the bottom row, raising the base line by

one dot position. This allows descending characters.

While neither chart shows it, the video screen produces greater separation between dots vertically than horizontally. This gives the appearance of longer tails, resulting in a more pleasing display.

The new VCG also replaced the Greek characters (see chart 1) with a duplicate set of upper case characters. This is for software compatibility, attempting to eliminate the need for a toggle switch, and for switching back to the normal (all upper case) mode.

Installing the new VCG

The new VCG (priced at \$19.95) is available from E B Garcia & Associates, 203 North Wabash, Chicago, Illinois 60601. It comes complete with installation instructions, which consist of opening up the keyboard unit, locating the VCG (IC 29), removing it and installing the new one. Those of you with later models can do this without using a soldering iron because you will have an IC socket. The older keyboards will require desoldering the original VCG from the printed circuit board and resoldering the new one.

The instructions describe a safe and easy method of desoldering the VCG for those who are inexperienced at doing so. They suggest that you remove the soldered VCG by clipping each of its pins, then removing them one at a time with a low wattage iron. This ruins the original VCG, but does provide a neat removal job.

The original VCG can easily be removed intact by using a desoldering braid (available from Radio Shack stores). It is used to soak up and remove solder from each pin on both sides of the printed circuit board until the pin wiggles freely. Then simply remove the VCG by hand. This provides a spare VCG for future projects or experiments.

One thing which the instructions do not suggest is to solder an IC socket in the board first, then plug the new VCG into the socket. This allows swapping the new and old VCG's.

The greatest advantage to the do-it-yourself lower case mod is cost. All it takes is a 2102 memory chip and toggle switch (for about \$5) and the new VCG.

Those of you who have procrastinated all this time and now feel you want to install this mod can obtain a copy of the necessary hardware and software changes free by sending a self addressed, stamped envelope to me at 216 South 18th Street, Yakima, Washington 98902.

Further Possibilities

The first 32 characters of chart 1 contain characters which are not normally used. However, they are available to programmers with the do-it-yourself mod and can be placed on the screen by using the POKE command.

The Model III was designed to perform this and comes with a set of special graphic characters in the first 32 locations, as well as in other locations. These include card symbols, a pointing hand and other symbols.

This VCG can be molded to your own specifications in several ways. The 32 special characters can be replaced with your own set in an EPROM (Eraseable Programmable Read Only Memory). Even foreign language characters could be programmed, which would be useful for teaching.

The VCG could also be replaced with switchable RAM circuitry enabling you to program your own character set from the keyboard. This could then be saved to tape or disk.

But making these changes will leave you on your own, and required to make your own repairs.

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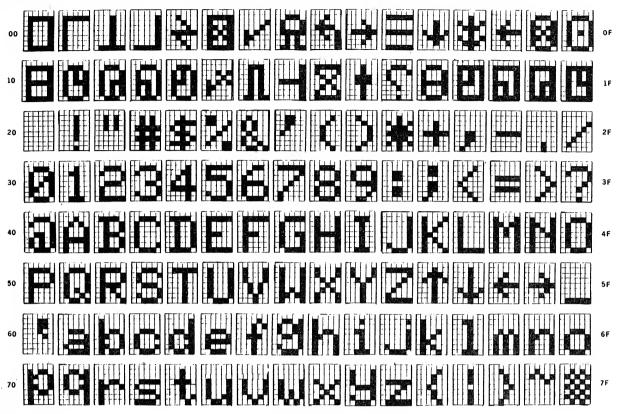


CHART #1

The above is the complete set of characters which the original Video Character Generator (VCG) of the

Model 1 is capable of producing when modified for lower-case (non-Radio Shack modification).

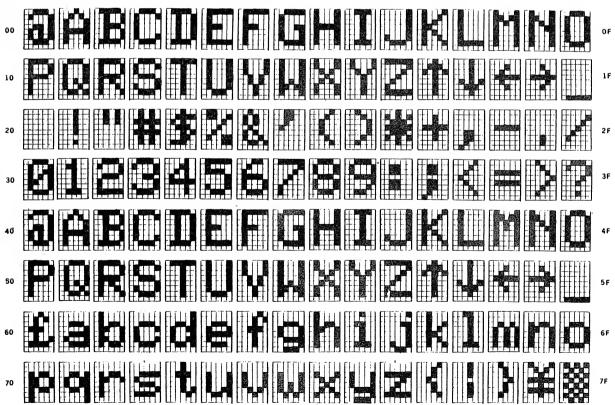


CHART #2

After having the Radio Shack lower-case modification installed, the new Video Character

Generator (VCG) is capable of producing the character set shown above.

The Micro Clinic
17375 Brookhurst # 114
Fountain Valley, CA 92708
\$24.95 + \$1 postage & handling
Minimum 16K Model I with 1 Drive
Floppy Doctor
Memory Diagnostic

Complete and specific diagnostic software is a must for anyone who wishes to insure long term reliability of their hardware. The Micro Clinic offers two programs on a single disk which are designed to seek out and identify those problems which may hamper the reliability of a computer system. They were created to find errors in two major problem areas of the TRS-80 Model I - the memory array and the disk controller and drives.

The Floppy Doctor

The Floppy Doctor is a machine language program for the diagnosis of any ailment that may befall your TRS80 and its disk drives. Aside from the program disk, the only thing necessary to run the utility on your computer is a formatted diskette for each drive to be tested.

The program disk contains its own loader and cannot be read by DOS software. To load the program, simply place the master diskette in drive O and depress the reset button. You will then be asked which program is to be run - Floppy Doctor or Memory Diagnostic. After selection, the appropriate program will load and in a few seconds will announce itself. The computer will ask you to specify the operating parameters for your drives. It will ask you which units are to be used (0-3), how many tracks (35 or 40), and the track-to-track access time (40 ms, 20 ms, 12 ms). If you are unsure about the specifications of your particular drives, the program documentation inclues the data for disk drives such as Shugart/Radio Shack, MPI, Vista and Pertec. After defining the parameters, you must enter which tests are to be run (A through E, or S). Tests may be run in any order, but running any given test assumes that the tests prior to it will run without errors. Any test may be specified to run more than once. Next, the computer will ask if it is to terminate on the occurance of excessive errors. This is provided as a means of escape from "endless loop" errors.

There are six separate tests in the diagnostic. These are:

Test A - checks the basic controller functions and status bits and also checks the function of mechanical components such as the track zero switch, the write-protect switch and the index pulse sensor.

Test B - verifies that data is being transferred from disk drive to the controller. It forces certain error conditions and also tests the drive seek function.

Test C - performs a single sector write/read. Data read back is then verified byte-by-byte to insure correct transfer to the CPU.

Test D - tests the write/read function across the entire diskette. It also checks cross-cylinder interference.

Test E - tests the write/read function across the entire diskette using all possible data patterns.

Test S - tests the accuracy of the drive motor speed. The allowable error is +/- 0.33%. Adjustments may be made on the drive while this test is in progress.

Three stepping rates are available so that drives may be tested at their full rated speed, and the read/write compatability between drives can be checked. Any of the tests may be run continuously if desired, to check for long-term reliability. The error messages are very detailed and complete. Said messages are reported when errors or abnormal conditions are detected. Error totals for each drive are displayed at the end of each diagnostic test. Errors are reported by type, with track and sector information printed out in hexadecimal.

The errors which the Floppy Doctor checks for are:

Drive sensed ready when not selected, write protect not sensed, busy flag not sensed, drive not ready, index mark sensed when not expected, index mark not sensed, write protect sensed, controller exceeded time limits for operation, track register is not being updated, track zero not sensed correctly, data is not being transferred to the controller, forced record-not-found error did not occur, forced lost data error did not occur, failed multiple-sector I/O operation. data read from disk is incorrect, record not found, seek error, CRC error and lost data.

The possible causes for errors which are checked are:

Bad drive motor, bad stepper motor, bad index mark sensor, bad or misaligned switch, dirty or worn head, carriage binding, worn or missing head load pad, bad expansion interface clock, defective or unformatted diskette, misaligned head, bad write/read board, bad expansion interface controller or interfacing circuits, out of tolerance drive motor speed, bad cables or dirty edge connectors, and (heaven forbidl) operator error.

This program provides a positive means to thoroughly check the disk controller circuits and drives, and to verify the reliability of a disk system.

Memory Diagnostic

The memory diagnostic half of the system diagnostic team is the least exciting but quite possibly the most useful. It consists of two routines which may be run either independently or together. The first routine is a write/read test which loads each memory address with every possible data pattern (a total of 2560) and also checks if data integrity is maintained over a given period of time. This same test checks to see if the addressing of any particular address alters the data contained in any other address. The second test is the "M-1 Worm" test. This test checks memory by attempting to execute a short (six byte) block of machine code from the memory under test. First, the entire test area is filled with hex FF. Then a special six-byte block of code is written into the first six locations and executed. If this works then the the block is shifted up one address. This continues until it has "inched" its way through the entire memory, hence the name.

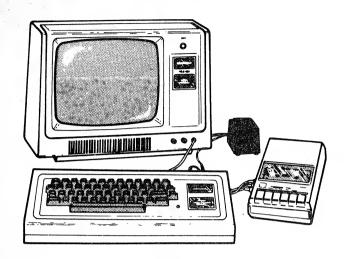
The amount of memory in your system determines the time each test will take to run. One pass of the test on a 48K machine, with the "Worm Test", will take about two hours. At the end of each complete pass, the total number of passes and the cumulative error count will be printed. The author of these programs recommends that the memory diagnostic be run a minimum of twelve hours, and that to really test the machine, at up to seventy-two hours at elevated temperatures.

Conclusions

These two programs are complete utilities which leave very little, if anything, to be desired. The documentation is clear and precise, and for all of the occasions during which human intervention (Ugh) is necessary, the inputs are made as fool-proof as possible. At the relatively low price of \$24.95, these programs are a must for any serious user of the TRS-80.

W W Harper II

FINE TOOLS FOR YOUR TRS-80



UTILITY I

Here's software utility that can make programming easier for you. These powerful tools will take much of the frustration out of essential operations. You'll wonder how you managed without them. They'll stamp your work with the mark of professionalism.

RENUM—Now you can easily renumber any Level II program to make room for modification or to clean up the listing.

(Only for use with 16K of memory.) **DUPLIK**—This program will let you duplicate any BASIC, assembler, or machine-language program, verify the data, and even copy Level I programs on a Level II machine.

See how efficient and well-ordered your programming becomes. (T1)

Order No. 0081R \$9.95.

UTILITY II

One of the most popular and useful of the utility packages, Utility II is the second in a series of programs designed to take the drudgery out of editing.

This combination of programs adds flexibity to your BASIC programs by allowing you to combine them with other BASIC programs, or with machine-language programs or routines.

CFETCH—You'll be able to merge BASIC programs, with consecutive line numbers, into one program. CFETCH can also search through any Level II program tape and display the file name for all the programs.

CWRITE—Combine subroutines that work in different memory locations into one program. CWRITE works with BASIC and/or one or more machine-language programs. It will even give you a general checksum to verify that your program hasn't dropped any bits.

Use these two programs as your dependable "assistants" to speed merging processes and as a totally reliable retrieval means in search and edit operations.

A fine tool for your TRS-80! (T1)

Order No. 0076R \$9.95.

ULTRA-MON

ULTRA-MON is a unique and powerful machine-language monitor. It is ROM independent and will function in Level II or DOS BASIC. With ULTRA-MON, vou will be able to write, modify, study and debug machine-language programs. Plus, you'll be able to avoid the frustrations and "bomb-outs" usually associated with machine-language programming. ULTRA-MON displays, disassembles, traces (hardcopy trace disassembly, too!), modifies, relocates memory, prints and even relocates itself with simple commands. Using interpretive execution, ULTRA-MON allows you to put breakpoints in ROM. This powerful monitor

can even fetch, decode, disassemble and analyze each instruction individually so that your program cannot bomb out.

ULTRA-MON is designed for the beginning machine-language programmer as well as the professional. The documentation contains a Simple Demonstration section geared to the novice programmer. Consequently, the program is a learning device as well as an extremely useful programming tool.

If you are serious about programming, you need to add this powerful utility to your library today. (TI)

Order No. 5003R \$24.95.

TLDIS & DLDIS

You've bought a super machine-code program, but now wonder how it works. Maybe you even used a quick PEEK routine to glance through it when it was in memory. If so, you definitely noticed the complete lack of comments in the code, making it almost impossible for you to decipher and understand it.

Well, Instant Software's Labeling Disassemblers are the answer to your prob-

TLDIS (Tape-based Labeling DISassembler) and DLDIS (Disk-based Labeling DISassembler) are three-pass, labelassigning disassemblers which assign labels (where appropriate) to the routines in a machine-language program. Their output is almost identical to that of a hand-assembled source code.

You can send the disassembly to a lineprinter (Radio Shack parallel port) for either TLDIS or DLDIS. (The difference between these utilities is the storage mode of the disassembly.)

TLDIS can send the disassembly to cassette tape, DLDIS can send it to disk; both send it to the video monitor. The stored disassembly from TLDIS may be reassembled with Radio Shack's EDTASMTM—the disassembly from DLDIS, with Apparat's extension of EDTASMTM. Because of the use of

labels, it is a simple matter to change any object code program by disassembling it and then making changes to the resultant source code, without losing track of jump/load addresses. Labels start with "AA00" and increment up, in even numbered steps (AA02, AA04, etc.). The odd numbers (AA01, AA03, etc.) are left for you to use for the source code during reassembly.

The printing of the disassembly may be temporarily halted by using [SHIFT] @ (just as in BASIC) or it may be ended by pressing the [BREAK] key. It also has a comments column to display ASCII characters used in a LD or CP opcode.

TLDIS and DLDIS may be relocated in memory to avoid conflict with the program you disassembler.

The next time you need to "climb inside" a machine-code program, take DLDIS or TLDIS with you. We promise that it will be an easier journey.

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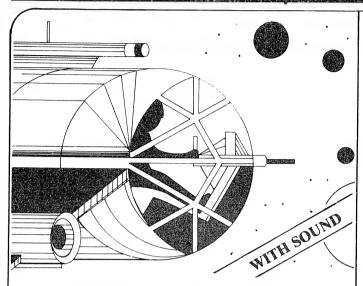
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DATE: 28.02.2047 LOCATION: 270 million miles from

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MISSION: Maintaining Terra's Space

anes

Briefing will follow:

1.1 Your mission is to destroy any asteroids in your sector and to prevent alicn spacecraft from infiltrating the Terran Defense Network.

1.2 Your ship is armed with an anti-matter cannon. You can shoot large asteroids, but this turns them into many smaller asteroids, each capable of destroying your ship.

1.3 In addition, alien ships can make in-

stantaneous hyperspace jumps into your area and start firing on your ship.

1.4 You'll need lightning reflexes and nerves of steel to survive Asteroid. We have no use for non-survivors!

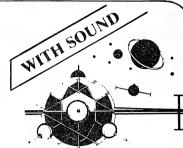
Asteroid, a real-time, machine-language game, features variable levels of difficulty, superb high-speed graphics, sound effects and automatic score keeping. (T1) or (T2)

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Imagine yourself at the control console of an LW-1417 Stratoblazer (Type B Strategic Laser Weapon). Your Hindsight Director informs you that a Gnat fighter is coming in for an attack. You pivot your gigawatt laser turret until you can see the target on your monitor. The Range Indicator shows him coming in fast. The Targeting Computer studies his course and speed as your finger tenses over the firing key. You know you'll have only a fraction of a second in which to react. The Gnat fighter's evasive maneuvers cause him to dance in your sights. Suddenly,



you see the FIRE Command and you react instinctively. Your laser beam lashes out and reduces the Gnat to an expanding ball of ionized gas. Mission accomplished!

Ball Turret Gunner, with your choice of multiple levels of difficulty, optional sound effects and superb graphics, is more than just a game. It's an adventure. Experience it! (T1)

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approaching INVADERS before they de-

stroy Earth. Before Earth's sensors failed,

they detected 550 armed invaders in

space, speeding toward us in 10 attack

formations of 55 in each group. The sen-

sors detected four different types of at-

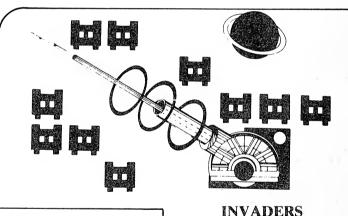
tack craft: Large, Medium, Small, and a

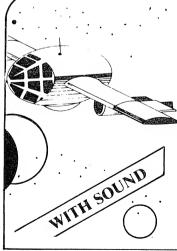
short profile craft which is the most dif-

ficult to destroy. If you cannot stop these

space attackers they will stop Earth.....

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COSMIC PATROL

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Level II, 16K RAM.

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80-U.S. Journal Jul/Aug 1981

Circle 18

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OKIDATA is OK

The Microline 80 has been around for almost two years. It has been a little work-horse for many of us. In this "tongue-in-cheek" article, Ira McComic tells of his experiences with it.

Ira McComic Plano, Texas

The romance was fading. That passion generated by newness and undiscovered delights which had first brought us together was cooling with familiarity and the realization of limitations. It was time for something new in our relationship.

After a few months of game playing with my TRS-80 16K Level II, I was ready to start writing all those brilliant programs sitting up there in my head. But

- 1. Being of penny-pinching character (partly through heredity, but mostly due to environment), I think it has more features per buck than many other printers. It is less than \$700 for the standard model (and maybe way less if you shop around).
- 2. It is an impact printer and, compared to thermal, flogging beats burning for print quality. Even better, you can get multiple copies if you would like to run off

"The problems were minor and were quickly solved."



To the left we have Jennifer McComic using her dad's new Microline 80.

after the short ones were finished, I realized that a printer was going to be needed to develop the larger ones.

Searching for just-the-right printer, I ran across an ad for the Okidata Microline 80. After a little more checking, that's the one which was brought home and placed next to the TRS-80. Several features of the Microline 80 made it the choice:

an extra for Auntie Blossom. Multiple copy capability is also handy for word processing and forms printing.

- 3. You can get a variable number of characters per line: 80 per line for programs and word processing and 132 for those home budget forms.
- 4. It is a dot matrix (9 X 7), which allows you to print both upper and lower case characters. Again, that's

handy for word processing work. Its print set also includes graphics and even kana characters.

- 5. It is a moderately fast 80 characters per second. That's no Secretariat, but it can gallop pretty good.
- 6. It has a Centronics-type interface and can be attached directly to the TRS-80's expansion interface line printer port. If you want though, there is an RS-232 option available.
- 7. Operating cost is minimal. With the Microline 80, you can print on just about anything made from wood pulp except termite droppings. You can use roll paper (a holder comes with the printer). You can insert $8\frac{1}{2}$ X 11" stationery, fan-fold paper, or Big Chief writing tablet sheets. Sprockets are included on the platen and a tractor feed is available as an option.
- 8. The little fellow is compact (truly a desktop printer), but is still plenty sturdy.

"...I think we sometimes cause more misery for ourselves as a result of not carefully reading what documentation there is. We are too excited about getting the gadget going."

The Microline 80 brought the TRS-80 and I back together again. While its many features are admirable, I didn't fully appreciate all those things back when I saw the ads.

I copied the phone number from the ad and gave the folks at Okidata a call. They answered a few questions I had and referred me to a representative in Dallas. The representative was real accommodating, and even brought out a printer to my office for me to check out.

When the salesman plugged in his demo driver box, turned on the power, and started printing uppercase characters, I was interested. But when it started printing lower-case, variable densities, and some surprising block graphics, he had me.

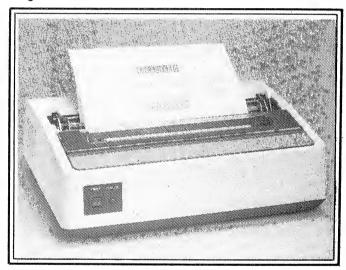
The new printer arrived securely packed along with *two* extra fuses and a reassuring printout which led me to believe that it was thoroughly tested before being shipped.

Since I already had the TRS-80 expansion interface, a cable and some roll paper was obtained from the Radio Shack store. A small concise manual came with the printer. One quick look at the book and I started in.

The printer was placed on a cleared spot on the desk beside the TRS-80, and the ribbon cable between the machine and the Microline 80 was connected.

The next step, according to the book, was to put in a ribbon. Whoops, hadn't thought about the ribbon. The salesman had told me a "standard Royal typewriter ribbon" was in his printer, so I hopped in my car (and nearly hopped right back out, since it was 113 degrees in Dallas that day and I've got vinyl seats), drove to an office supply store, grabbed a ribbon, and scooted back.

I was sure surprised when the ribbon didn't fit. After looking a little further in the manual, I found that Okidata called for an *Underwood* type ½" standard spool with eyelets, so it was back into the car (cautiously this time), back to the store and get the right ribbon.



I know that we personal computer types often complain about poor documentation and there is plenty of printed trash out there that is not greater than or equal to worthless, but I think we sometimes cause more misery for ourselves as a result of not carefully reading what documentation there is. We are too excited about getting the gadget going.

Anyway, I laid in the ribbon, rolled in some paper, hit the power on the TRS-80 and the printer and entered:

100 LPRINT"THIS IS A TEST." and finished with a deft RUN and ENTER.
This is what I got:

ドイチナイギギギサー・ギュノボイ

Now, I'm not a language expert (I don't even handle my native English real well as my old fifth grade teacher, Mrs Hartline, will verify), but could those be

Japanese characters? A quick look at the manual confirmed the Microline 80 was capable of printing katakana characters.

Hmmmm.

Clearly, there were two choices: Learn to write programs in Japanese or figure out some way to get that printer to speak English. Since the first choice seemed too time consuming, the second was tried.

Looking the printer over more carefully than a mother counting a new baby's toes, no button was found that said, "Push here for English".

OK, as a last resort, let's see what the manual says. I looked through the small manual (less than 30 pages) but couldn't find any directions on how to proceed.

Now what was to be done? I was hoping at least to be able to print out a short recipe program to pacify my wife and help persuade her that this printer was a better investment than patio furniture.

With no particular ideas about what to do, I began flipping through the manual again. There were some interesting notes about what control characters to use to change character densities and the number of lines per inch and there was the usual ASCII character table. If you've seen one ASCII character table, you have seen them all, except this one showed you some otherwise non-printing codes that would produce graphic characters. But even more important for the moment, there was a small note at the bottom that read, "Shift S1 jamper (sic) plug to Side A, and S3 to Side A. (left column) (ASCII)"

That cryptic note seemed to imply that English or katakana characters were jumper selectable - and that certainly makes sense. Since the previous inspection of the printer established the jumpers were not on the outside of the printer, they must be on the inside. See, it doesn't take a mental Goliath to be a computer enthusiast (and there are quite a few personal acquaintances who would testify to that).

Quicker than you can say, "Which one of you kids took Daddy's screwdriver?", the hood was popped on the printer to see if the alleged S1 and S3 jumpers could be found. Sure enough, there they were, sitting on top of the circuit board behind the platen as smug as a crooked county judge. One of the jumpers had a shorting plug in the right place, but the other one was as naked as a ring finger in a singles bar.

I twisted a short piece of wire around the bare shorting pins, reached over to the TRS-80 and tapped in RUN.

"THIS IS A TEST.", leaped out on the printer in bold English.

For an ol' boy who's done his share of sinning, that had worked out alright. Now, let's really see what this baby's made of. I entered a short, five-line program (took me five minutes to get it right with the Level II keybounce problem - gotta get that fixed one of these days) and then typed LLIST.

The Okidata chattered away like a squirrel at a nut cracking bee and printed all the program lines. However, each line was printed on top of the other.

Back to the manual again. It said that if you want an automatic line feed after the printer receives a carriage return, slip the S4 shorting plug to Side B.

Fortunately, the lid was still off of the printer. But again, there was no shorting plug at all on either side B or side A of S4. After taking a few turns around the jumper pins on side B with some hookup wire and typing in LLIST again, each line printed out on its own property. Ah, that's better; a line feed with every carriage return, just like a promise with every politician.

I tried a few more experiments with the printer and finally, convinced that everything was working well enough to please even a mother-in-law, I fastened down the lid and leaned back with the comforting feeling I had made a wise selection.

I called Okidata the next day to ask about the missing jumper plugs. A representative there assured me that my printer was an unusual case, that the printers sold in the United States are jumpered for English. He promised to send me a couple of jumper plugs to replace the wires I had stuck on. He said he was aware of a number of printers which were being used with the TRS-80. He had heard no reports of any of the problems I had encountered in connecting the Microline 80 to my TRS-80.

The problems were minor and were quickly solved. I am pleased with the printer and think it will prove to be a good investment. It's really rekindled a new interest in my TRS-80. At this point, Okidata is OK.

Okidata Microline 80 Printer Features

omata merenne de l'inter l'outures			
Print System	Impact dot matrix		
Character composition	9 X 7 dot matrix		
Printing speed	80 characters/sec @ 10 or 16.5 characters per inch.		
	40 characters/sec @ 5		
	characters/inch.		
Maximum characters/line	80 characters/line @ 10 char/in.		
	40 characters/line @ 5 char/in.		
	132 characters/line @ 16.5		
	characters/inch.		
Line spacing	6 or 8 lines per inch, software		
	selectable.		
Character types	64 alphanumeric characters and symbols.		
	32 lower case English characters characters and symbols.		
	64 kana characters and symbols		
	64 graphics symbols		
Interface	Centronics-type parallel,		
interlace	standard.		
	RS-232 is optional		
	113-232 is optional		

13.46" wide, 9.65" deep, 4.25" Weight 14.3 lbs without paper (approx)

standard.

Table 1. Microline 80 Printer Specifications

Paper feed

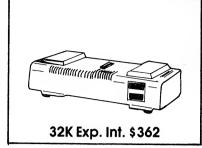
Dimensions

Friction/fixed pins @ 9" centers

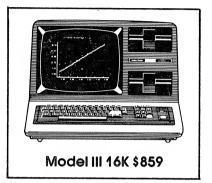
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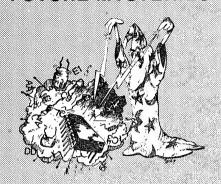
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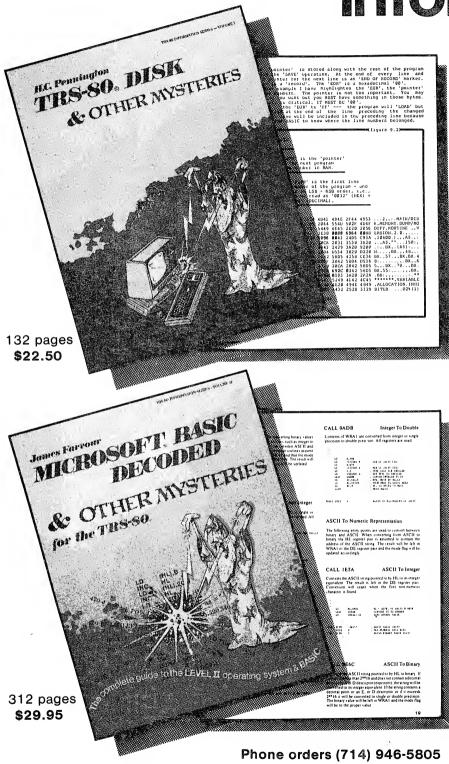
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Sometimes I wonder if I should retitle this column, "Fancy Things You Can Do with the TRS-80 Keyboard." You'd think everything has been said on that subject by now, though. But consider the fact that almost everything that the TRS-80 does results from something that someone, somewhere, typed in on a keyboard. In that light, a keyboard interface can have a universal and far-reaching effect. So if none of you are tired of keyboard routines, I'm not either. And here is yet another one.

The impetus for this routine (PRKEY, for Model I only) is the fact that you can do nearly anything from the keyboard, but not from a Basic program. A Basic program, for example, can't modify itself. (Not that that's always such a good idea, but there are times it would be nice.) PRKEY removes those limitations by allowing you to PRINT things you would otherwise type in by hand, and to interpret the printed material as keyboard input. You could, for example, print a series of DATA statements whose values depend on computational results. When the program terminates and user input is expected, these DATA statements will be entered into the program. (See Example 1.) This can be handy for setting up arrays for functions like SIN and COS which take a while to compute. You could also use PRKEY in conjunction with the INPUT statement to prompt the user with the default value of an input variable. He could backspace and change it or hit ENTER to accept it. (Example 2).

PRKEY works with the display and keyboard drivers and uses a circular (wraparound) buffer. Characters printed following a CHR\$(1) and terminated with either a CHR\$(0), a carriage return, or a computer request for keyboard input, are entered into the buffer and not displayed. Subsequent calls to the keyboard cause these characters to be removed one

at a time from the buffer and returned, until the buffer is empty or until the BREAK key is struck. To the computer, it looks as if the characters were entered from the keyboard. There is one restriction, however. The routine only works for line input, that is, input prompted by the X,?, etc. It was not designed for use with INKEY\$. The reason is that some method must be used to tell whether the computer really wants a character or whether it's just looking for a BREAK or SHIFT@. Unfortunately, the keyboard driver is called for both purposes (in my mind a shocking oversight on the part of the Level II authors). With unrestricted use, BREAK key checking alone could empty the buffer completely.

By limiting use to line input, a hook in Level II RAM can be used to flag a legitimate keyboard call. This hook is at address 41AF and contains either a RET or a JP into DOS. It is called just before the computer requests a line of input. By putting a JP here to some code in PRKEY, we can set a flag saying it's okay to send characters out of the buffer. At the next carriage return, this flag is reset.

PRKEY is divided into four main sections: 1) The START block, which does the linking, 2) PRINT which directs printed output to either the screen or the keyboard buffer, 3) KEYBUF, which flags imminent line input, and 4) KEYBD, which transmits characters from either the buffer or the keyboard.

To use PRKEY, key it as shown into EDTASM, make an object tape or file, and load it via SYSTEM or from disk. (Don't forget to set memory size equal to your origin.) Execute the START block, and you're ready to go. PRKEY is a program that invites experimenting. Just be sure to use an expendable disk, though, because you might PRINT a command you don't want and won't be fast enough to stop.

```
7E45
               00090
                               ORG
                                        07E45H
                                                         OR OBE45H OR OFE45H
7E45 2A1640
               00100 START
                                        HL, (4016H)
                                                         LINK IN KEYBOARD
                               LD
7E48 22DB7E
               00110
                               LD
                                        (REGKEY+1),HL
7E4B 21B37E
               00120
                               LD
                                        HL_KEYBD
7E4E 221640
                                        (4016H),HL
               00130
                               LD
7E51 2A1E40
                                                         ;LINK IN DISPLAY
               00140
                               LD
                                        HL, (401EH)
7E54 22A27E
               00150
                               LD
                                        (OLDPR+1) HL
7E57 21777E
               00160
                               LD
                                        HL_PRINT
7E5A 221E40
               00170
                               LD
                                        (401EH),HL
7E5D 3AAF41
               00180
                               LD
                                                         XFER BUFF'D INPUT HOOK
                                        A (41AFH)
7E60 32B07E
               00190
                                        (KLINK),A
                               LD
7E63 2AB041
               00200
                               LD
                                        HL, (41BOH)
7E66 22B17E
               00210
                               LD
                                        (KLINK+1),HL
7E69 3EC3
               00220
                               LD
                                        A _OC3H
                                                         ;REPLACE W/ JP KEYBUF
7E6B 32AF41
               00230
                               LD
                                        (41AFH) <sub>A</sub>A
7E6E 21A87E
               00240
                               LD
                                        HL,KEYBUF
7E71 22B041
               00250
                               LD
                                        (41B0H),HL
7E74 C3CCO6
               00260
                               JP
                                        O6CCH
                                                         OR JP 402DH FOR DOS
7E77 3AF97E
               00270 PRINT
                                                         GOES IN BUFFER?
                               LD
                                        A (MODE)
               00280
7E7A B7
                               OR
                                        Α
7E7B 2821
               00290
                               JR
                                        Z,REGPR
                                                             NO: DISPLAY
7E7D 79
               00300
                               LD
                                       A,C
                                                             YES: ALL DONE?
7E7E B7
               00310
                               OR
7E7F 2823
               00320
                               JR
                                        Z, NEWMD
                                                             YES: RESET MODE
7E81 2AFD7E
               00330
                               LD
                                        HL, (BUFPP)
                                                                  GET BUFFER PTR
                                                             NO:
7E84 71
               00340
                               LD
                                                         ;PUT CHAR IN BUFFER
                                        (HL),C
7E85 E5
               00350
                               PUSH
                                        HL
                                                         ;SAVE OLD PTR
7E86 CDEF7E
               00360
                               CALL
                                        INCHL
                                                         ;INC PTR
7E89 22FD7E
               00362
                               LD
                                        (BUFPP),HL
                                                         ; AND SAVE
7E8C ED5BFB7E 00370
                               LD
                                        DE, (BUFPI)
                                                         GET KEYBD PTR
7E90 DF
               00380
                               RST
                                        18H
                                                         :BUFPP=BUFPI?
7E91 E1
               00390
                               POP
                                        HL
                                                         ; (RESTORE OLD BUFPP)
7E92 2003
               00400
                               JR
                                        NZ,HLOK
                                                             NO: BUFFER NOT FULL
7E94 22FD7E
               00410
                                        (BUFPP),HL
                               LD
                                                             YES: FULL; RESAVE OLD BUFPP
7E97 79
               00420 HLOK
                               LD
                                                         ;A CARRIAGE RETURN?
                                        A,C
7E98 FEOD
               00422
                               CP
                                        13
7E9A CO
               00424
                               RET
                                        NZ
                                                             NO: STILL BUFFERING
7E9B AF
               00426
                               XOR
                                                             YES: DONE BUFFERING
7E9C 1806
               00428
                               JR
                                        NEWMD
7E9E 79
               00430 REGPR
                               LD
                                                         ;START BUFFERING?
                                        A,C
7E9F FE01
               00440
                               CP
               00450 OLDPR
7EA1 C20000
                               JP
                                        NZ,$-$
                                                             NO: JUST DISPLAY
7EA4 32F97E
               00460 NEWMD
                               LD
                                        (MODE),A
                                                             YES: SET MODE
7EA7 C9
               00470
                               RET
                                                                  AND THAT'S ALL
7EA8 AF
               00480 KEYBUF
                               XOR
                                                          TERMINATE BUFFERING
7EA9 32F97E
               00490
                               LD
                                        (MODE),A
7EAC 3C
               00500
                               INC
                                                         FLAG BUFFERED INPUT
                                        Α
7EAD 32FA7E
               00510
                               LD
                                        (KMODE),A
7EBO C9
               00520 KLINK
                               RET
                                                         :AND RETURN
0002
               00530
                               DEFS
                                        2
                                                         ;ROOM FOR ADDR IF RET IS JP
7EB3 3AFA7E
               00540 KEYBD
                               LD
                                        A, (KMODE)
                                                         ;BUFFERED INPUT?
7EB6 B7
               00550
                               OR
7EB7 2821
               00560
                               JR
                                        Z, REGKEY
                                                             NO: CALL FROM SOMEWHERE ELSE
7EB9 2AFB7E
               00570
                               LD
                                        HL, (BUFPI)
                                                         GET INPUT PTR
7EBC ED5BFD7E 00580
                               LD
                                        DE, (BUFPP)
                                                         ;AND PRINT PTR
```

```
7ECO DF
              00590
                             RST
                                     18H
                                                     ; ARE THEY THE SAME?
7EC1 280A
               00600
                                     Z,EMPTY
                             JR
                                                     ; YES: BUFFER IS EMPTY
7EC3 4E
               00610
                             LD
                                     C (HL)
                                                     ; NO: GET NEXT CHAR
7EC4 CDEF7E
               00620
                             CALL
                                     INCHL
                                                     ; INC PTR
7EC7 22FB7E
              00622
                             LD
                                     (BUFPI),HL
                                                     ;AND SAVE
7ECA 79
               00630
                             LD
                                     A_C
                                                      GET CHAR IN A
7ECB 1803
              00640
                             JR
                                     CRCHEK
                                                     CHECK FOR CARRIAGE RET
7ECD CDDA7E
               00650 EMPTY
                             CALL
                                     REGKEY
                                                     ; CALL KEYBOARD
7EDO FEOD
               00660 CRCHEK
                             CP
                                     13
                                                     ;A CR?
7ED2 CO
               00670
                             RET
                                     NZ
                                                     ; NO: NORMAL RETURN
7ED3 4F
              00680
                             LD
                                     C,A
                                                     ; YES: SAVE IT
7ED4 AF
               00690
                             XOR
                                     Α
                                                      ; END OF BUFFERED INPUT
7ED5 32FA7E
              00700
                             LD
                                     (KMODE),A
7ED8 79
              00710
                             LD
                                     A,C
                                                     GET CR BACK
7ED9 C9
              00720
                             RET
                                                     ;AND RETURN
7EDA CD0000
              00730 REGKEY
                                     $-$
                             CALL
                                                     ; CALL KEYBOARD
7EDD FE01
              00740
                             CP
                                     1
                                                     #BREAK KEY HIT?
7EDF CO
               00750
                             RET
                                     NZ
                                                     ; NO: OKAY
7EEO 2AFB7E
              00760
                                     HL, (BUFPI)
                             LD
                                                     ; YES: EMPTY BUFFER
7EE3 22FD7E
              00770
                             LD
                                     (BUFPP),HL
7EE6 AF
              00780
                             XOR
                                                      ;TERMINATE BUFFERED INPUT
7EE7 32F97E
              00790
                                     (MODE),A
                             LD
7EEA 32FA7E
              00800
                             LD
                                     (KMODE),A
7EED 3C
              00810
                             INC
                                                      GET BREAK BACK
7EEE C9
              00820
                             RET
                                                     ;AND RETURN
7EEF 23
              00830 INCHL
                             INC
                                                     ;INCREMENT POINTER
7EFO 11FF7F
              00840
                             LD
                                     DE,BUFEND
                                                     ;PAST END OF BUFFER?
7EF3 DF
              00850
                             RST
                                     18H
7EF4 CO
              00860
                             RET
                                                     ; NO: OKAY
                                     NZ
7EF5 21FF7E
              00870
                             LD
                                     HL,BUFFER
                                                        YES: LOOP BACK TO START
7EF8 C9
              08800
                             RET
                                                     ;AND RETURN
7EF9 00
              00882 MODE
                                     0
                             DEFB
                                                     ;DISPLAY MODE
7EFA 00
              00884 KMODE
                             DEFB'
                                     0
                                                     ;INPUT MODE
7EFB FF7E
              00890 BUFPI
                             DEFW
                                     BUFFER
                                                     ;INPUT BUFFER PTR
7EFD FF7E
              00900 BUFPP
                                     BUFFER
                             DEFW
                                                     ;DISPLAY BUFFER PTR
0100
              00910 BUFFER
                             DEFS
                                     256
                                                     ;BUFFER (ANY SIZE OKAY)
7FFF
              00920 BUFEND EQU
                                                     ;END OF BUFFER
7E45
              00930
                             END
                                     START
                                                     ;AUTOSTARTS @ START
00000 TOTAL ERRORS
BUFEND 7FFF 00920
                     00840
BUFFER 7EFF 00910
                    00870 00890 00900
                    00370 00570 00622 00760
BUFPI 7EFB 00890
BUFPP 7EFD 00900
                    00330 00362 00410 00580 00770
CRCHEK 7EDO 00660
                    00640
EMPTY 7ECD 00650
                    00600
.HLOK
       7E97 00420
                    00400
INCHL 7EEF 00830
                    00360 00620
KEYBD 7EB3 00540
                    00120
KEYBUF 7EA8 00480
                    00240
KLINK 7EBO 00520
                    00190 00210
KMODE
      7EFA 00884
                    00510 00540 00700 00800
       7EF9 00882
MODE
                    00270 00460 00490 00790
NEWMD 7EA4 00460
                    00320 00428
```

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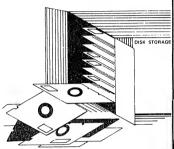
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Circle 42

OLDPR 7EA1 00450 00150
PRINT 7E77 00270 00160
REGKEY 7EDA 00730 00110 00560 00650
REGPR 7E9E 00430 00290
START 7E45 00100 00930

10 PRINT CHR\$(1);"100 DATA";

20 FOR I=0 TO 15

30 PRINT SIN(I*6.2831854/16);",";

40 NEXT

50 PRINT CHR\$(8):REM THIS BACKSPACE REMOVES THE LAST COMMA.

Example 1

How to create a 16-value DATA statement from a Basic Program.

250 PRINT CHR\$(1);A;CHR\$(0) 260 INPUT "WHAT IS THE AMOUNT";A

Example 2

A section of code in which the current value of A is assumed as input unless the user backspaces over it and types something else.

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Introduction

R C Bahn

The Basic language primarily recognizes two types of variables. These are called numerical variables and strings. The name of a string variable is recognized by the presence of a dollar sign (\$) as the last character of the name. In Level II Basic, string variables are composed of characters which may be numerals (0-9), alphabetical characters (A-Z), special symbols or graphics characters. String variables are delimited or identified by a preceeding and following double quote ('') sign. Thus in Basic one could type:

30 A\$="THIS IS A STRING"

40 PRINT A\$

Line 30 defines the string called A\$. Line 40 displays A\$ on the video screen.

Within the computer's memory only numbers are stored. Consequently, a numerical code must be used to represent the individual characters of a string. This code is very important for the storage of strings in memory, for the transmission and storage of string characters to tape and disk files, for the transmission and display of string characters on the video screen or line printer, for the storage of string variables within Basic programs as DATA.

The ASCII Code is the code which is most widely accepted in the computer industry for the processing of strings. ASCII stands for the American Standard Code for Information Interchange. The manner in which the TRS-80 implements this code is outlined in your Basic Reference Manual. Specifically, in the Level II Basic Reference Manual (Second Edition) it appears on pages C/1 to C/6. In general, for the TRS-80 Model I, the code extends from 0 to 191. Numbers 0 to 31 are control codes; numbers 32 to 95 are the standard upper case keyboard display characters; numbers 96 to 127 are the lower case counterparts; numbers 128 to 191 are graphics characters; numbers 192 to 255 are space compression codes, which are not relevant to our present discussion.

Operations with Strings

This topic is sufficiently large to be the subject of several exercises and will only be briefly outlined. These descriptions plus the text of the reference manual, should provide sufficient information for the purposes of the following interactive program.

In addition to six bytes of storage for name, length and address of a string variable, each character of a string variable occupies 1 byte of memory, thus the first consideration in the processing of strings is memory management. One may reserve space for the characters of string variables by the CLEAR N statement, where N is the number of bytes reserved

for string storage. When not specified, 50 bytes of memory are routinely reserved for string storage. The amount of memory available for string storage can be ascertained by the FRE(A\$) statement. A\$ is a dummy argument.

String variables may be assembled by the addition or concatenation process. The expression C\$=A\$+B\$ appends the string B\$ to the end of A\$ and stores the result in C\$. RUN the following program:

60 A\$="A":B\$="B":C\$=A\$+B\$:PRINTC\$

FIGURE 1

- 10 REM****** INITIALIZATION ******

- 20 CLEAR 500
- 30 C\$="### %% "
- 40 REM******** MENU ROUTINE ****

- 50 CLS:INPUT"KEYBOARD ROUTINE(1),OR ASC II CODE(2)--PRESS ENTER"; Z\$
- 60 IF Z\$="2" THEN 150
- 70 REM****** KEYBOARD ROUTINE *****
- 80 CLS
- 90 PRINT" DEMONSTRATION OF INPUT OF ASC II CHARACTERS FROM THE KEYBOARD"
- 100 PRINT:PRINT:PRINT"PRESS ANY KEY, ESC APE IS THE PERCENT SIGN(%)"
- 110 A\$=INKEY\$: IF A\$="" THEN 110
- 120 IF A\$="%" THEN 50
- 130 PRINT"A\$=";A\$,"ASC(A\$)=";ASC(A\$),"V
 AL(A\$)=";VAL(A\$)
- 140 GOTO 110
- 150 REM ****** ASCII ROUTINE ******

- 160 CLS
- 170 INPUT"ENTER BEGINNING CODE NUMBER";
- 180 IF A<32 OR A>128 THEN 170
- 190 N=0
- 200 FOR I=A TO A+63
- 210 N=N+1
- 220 PRINT USING C\$; I, CHR\$(I);
- 230 IF N<57 AND N=INT(N/8)*8 THEN PRINT
- 240 NEXT I
- 250 INPUT"TO CONTINUE, PRESS ENTER"; Z\$
- 260 GOTO 50
- 270 END

String variables may be automatically assembled by the STRING\$ (N,C) statement where N is the length of the string and C is the character. RUN the following program:

150 A\$=STRING\$(32,"*"):PRINT A\$

Several modes of representation of data can be encountered in computer processing. The programmer may want to convert a character from a decimal to a character representation. This is accomplished by the STR\$(A) statement, where A is the decimal number. The inverse process or character to decimal conversion is accomplished by the VAL(A\$) statement, where A\$ is the string representation.

Conversion from a character representation to the ASCII Code is accomplished by the ASC(A\$) statement, where A\$ is a single character string. The inverse process or ASCII to character conversion, is accomplished by the CHR\$(A) statement, where A is the ASCII code number.

String variables may be disassembled or analyzed by: 1) the LEFT\$(A\$,N) statement, where A\$ is the name of the string and N is the number of characters starting on the left which are to be returned; 2) the RIGHT\$(A\$,N) statement, where A\$ is the name of the string and N is the number of characters starting on the right which are to be returned; 3) the MID\$(A\$,N,L) statement, where A\$ is the name of the string, N is the sequence number of the starting character and L is the length of the string to be returned.

The length or number of characters of a string may be ascertained by use of the LEN(A\$) statement, where A\$ is the name of the string. The maximum length of a string variable in Level II and Disk Basic is 255 characters. However, problems with tape files will arise if the length of a string variable is greater than about 240 characters. It is a good practice in any application involving long strings to first carefully read the reference manuals and then to thoroughly test the algorithm before committing large amounts of data to the program.

In Disk Basic, the starting position of the first occurrence of a substring in a target string is returned by the INSTR(N,A\$,B\$) statement. N specifies a position in the target string where the search is to begin. A\$ is the name of the target string. B\$ is the name of the substring.

Also in Disk Basic, any part of a string may be replaced with a specified substring by the use of the MID\$(A\$,N1,N2)=B\$ statement. A\$ is the name of the target string to be changed. B\$ is the name of the replacement string. N1 specifies the starting position in A\$ for the replacement. N2 specifies the number of characters to be replaced.

The INKEY\$ statement causes the computer to strobe the keyboard and return a one-character string corresponding to the key pressed during the

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ALL COMMANDS DIRECTLY SUPPORTED BY ZBASIC

FOR	NEXT	STEP	IF.	THEN	ELSE	PEEK
SET	RESET	POINT	CHR\$	RANDOM	RND	POKE
DATA	READ	RESTORE	END	GOTO	GOSUB	CLS
INPUT	INKEY\$	LET	STOP	OUT	INP	RETURN
PRINT	LPRINT	PRINT(ii)	USR	SGN	INT	ABS
SQR	LEN	ASC	VAL	STR\$	POS	ON GOTO
ON GOSUB	REM	NOT	AND	OR		
INTEGER MATH	'MULTIPLY	/DIVIDE +A	DD -S	UBTRACT	1 / 32767	
NOTE Some con	nmands do no	of act exactly as	BASIC	commands ac	1	

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strobe. The null string ("") is assumed if no key is depressed.

Interactive Program

The interactive program listed in Figure 1 consists of an initialization module, a menu module, a keyboard module and an ASCII code module.

The keyboard module enables one to study the symbols generated by the keyboard when a string variable is expected by the program. Following the symbol, the corresponding ASCII code associated with the symbol is printed on the video screen. If the symbol is a numeral, its decimal value is also printed. Try all possible keyboard entries, both upper and lower case. Note that if there is no lower case modification in your computer, only upper case alphabetical symbols will be printed on the video screen, but the proper ASCII codes will be generated.

The ASCII code module in Figure 2 allows one to more efficiently examine 64 consecutive symbols. Three passes through this module of the program will display the entire code. Three entry points which would accomplish this are 32, 63 and 128.

Compare the results of your keyboard exploration with the results displayed by the ASCII routine. In addition to the upper-lower case disparity, several other keys generate non-standard responses. Can you find them?

LINE COMMENT

- 10-30 Initialization module.
 - 20 Clear memory and reserve 500 bytes of memory for string variables and constants.
 - 30 C\$ is format for the PRINT USING statement in line 220. It consists of eight spaces. The number signs (#) reserve a maximum of three spaces for a numeral. The percent signs (%) reserve a maximum of two spaces for a string.
- 40-60 Menu module.
 - 50 Clear screen, print the menu prompt. The keyboard entry is a string variable called Z\$.
 - 60 If Z\$ equals the string constant "2" the program will branch to line 150.
- 70-140 Keyboard routine.
- 90-100 Print header and instructions.
 - 119 Keyboard scan routine.
 - 120 Escape routine; if the percent sign (%) is pressed the program will return to the menu at line 50.
 - print labels and symbols returned by various string processing statements. The character depressed at the keyboard will be printed as A\$. Next, the ASCII code returned from the keyboard appears. Note the characters which on the TRS-80 keyboard do not correspond to the ASCII standard. (See text). Finally, if the keyboard input is a numeral, the decimal VAL(ue) of the number will be printed. It will be indistinguishable from A\$ on the video screen. If the keyboard input is not a numeral, a zero will be printed on the screen.

- 140 Loop to line 110 for next keyboard input.
- 150-270 ASCII routine.
- 160-170 Clear screen and print the input prompt. The keyboard entry is the numerical variable A.
 - 180 If the numerical input is not 32-128, repeat the input prompt.
 - 190 Initialize the screen symbol counter N.
 - 200 Initialize a FOR..NEXT loop to run from the input number to the input number plus 63. This amounts to 64 values.
 - 210 Increment the symbol counter N.
 - 220 Print the index number (I) which is the ASCII code number and the symbol which it represents (CHR\$(I)).
 - 230 If the number of symbols printed is less than 57 (seven lines) and the number of symbols is exactly divisible by8, then print a blank line.
 - 240 End of loop.
 - 250 Hold the screen for inspection.
 - 260 Return to the menu.

Figure 2

- 100 CLEAR 3000
- 105 CLS
- 110 B\$="### %% "
- 120 INPUT"ENTER BEGINNING ASCII CODE";B
- 130 EN=BE+63
- 140 N=0
- 150 FOR I=BE TO EN
- 160 N=N+1
- 170 A\$=CHR\$(I)
- 180 PRINT USING B\$;1;A\$;
- 190 IFN<57 AND N=8*(INT(N/8)) THEN PRIN
- 200 NEXT I
- 210 GOSUB 2000
- 220 GOTO 105
- 2000 REM***** SCREEN HOLD SUBROUTIN
 - E WITH PRINTER OPTION***
- 2010 Z\$=INKEY\$:IF Z\$="" THEN 2010
- 2020 IF Z\$="P" THEN 2500
- 2030 RETURN
- 2500 N=0
- 2505 A\$=""
- 2510 FOR I=15360 TO 16383
- 2520 N=N+1
- 2530 Q=PEEK(I)
- 2540 IF Q<32 THEN Q=Q+64
- 2550 IF Q=34 THEN Q=191
- 2555 IF Q>127 THEN Q=Q-64
- 2560 A\$=A\$+CHR\$(Q)
- 2570 IF N<> 64*(INT(N/64)) THEN 2600
- 2580 LPRINT A\$
- 2590 A\$=""
- 2600 NEXT I
- 2650 RETURN



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Figure 3

In the following program the "symbol stands for the up-arrow.

10 REM****** SUMMARY OF ASCII CODE TE XT DEMONSTRATIONS ****

20 CLEAR 500:CLS

30 A\$="THIS IS A STRING"

40 PRINT"A\$=";A\$

50 GOSUB 300

60 A\$="A"

70 B\$="B"

80 C\$=A\$+B\$

90 PRINT"CONCATENATION"

100 PRINT"A\$=","B\$=","C\$=A\$+B\$"

110 PRINT AS,B\$,C\$

120 GOSUB 300

130 PRINT"FREE STRING SPACE="; FRE(A\$)

140 GOSUB 300

150 A\$=STRING\$(25,"*")

160 PRINT"A\$=STRING\$(25,'*')","A\$=";A\$

170 PRINT"LEN(A\$)=";LEN(A\$),"FREE STRIN
G SPACE=";FRE(A\$)

180 GOSUB 300

190 PRINT"ARROW SYMBOLS"

200 PRINT CHR\$(91), CHR\$(92), CHR\$(93), CHR\$(94)

210 GOSUB 300

220 PRINT"DEMONSTRATION OF SINGLE CELL GRAPHICS CHARACTERS"

240 PRINT "ASCII CODES", "INCREMENT (K)", "PLACEMENT OF SINGLE CELL"

250 FOR I=0 TO 5

260 K=2^I

270 L=128+K

275 IF K=1 THEN K\$="UPPER LEFT" ELSE IF K=2 THEN K\$="UPPER RIGHT" ELSE IF K=4 THEN K\$="MID-LEFT" ELSE IF K=8 THEN K\$="MID-RIGHT" ELSE IF K=16 THEN K\$="LOWER LEFT" ELSE IF K=32 THEN K\$="LOWER RIGHT"

280 PRINT"191,";L;",191",K,K\$, CHR\$(191);CHR\$(L);CHR\$(191):PRINT

290 NEXT I:END

300 REM***** SCREEN HOLD ROUTINE ***

310 INPUT"TO PROCEED, PRESS ENTER"; Z\$
320 RETURN

Discussion

The keyboard of the TRS-80 Model I and III contain several keys which do not return standard ASCII values. These are the left arrow, the right arrow, the down arrow and the "shift@" keys. On the TRS-80 keyboard, these keys perform various control functions. The control functions comprise ASCII codes 0-31.

Despite being unable to obtain the three arrow characters directly from the keyboard, all arrow characters will be printed on the video screen or printer by designating the proper ASCII code. (This is true for the Model I, the Model III prints standard ASCII characters.) RUN the following program:

200 PRINTCHR\$(91), CHR\$(92), CHR\$(93), CHR\$(94) Finally, it is important for you to know about the ASCII code to increase your understanding of the manner in which your data is stored and transferred.

and to understand the peculiarities of the keyboard. You may use the ASCII code representation of a character whenever the Basic statement requires such a designation. For example, PRINT "A" and PRINT CHR\$(65) are equivalent. So also are PRINT STRING\$(63, "A") and PRINT STRING\$(63, CHR\$(65))

You can avoid your actual use of the ASCII code in most programming except manipulation of graphics blocks. As you know, in the character mode the TRS-80 screen consists of sixteen line of 64 characters for a total of 1024 regions or blocks. These are indexed from the upper left hand corner of the screen to the lower right hand corner and are numbered 0 to 1023. These indices are used in the PRINT@ statement.

Each of these character blocks can be subdivided into six smaller cells of three rows and two columns. The ASCII code for the graphics characters (128-191) represents all the on-off combinations of the six cells. Including all off, there are 64 (or 2 raised to the sixth power) such combinations. ASCII code 128 represents the blanked cell. To turn on a particular cell, one adds the appropriate power of 2 to 128. The increment for the upper left cell is 1, for the upper right cell is 2, for the mid left cell is 4, for the mid right cell is 8, for the lower left cell is 16 and for the lower right cell is 32. The graphics character code for all the cells turned ON is (128+1+2+4+8+16+32)=191.

' To generate all the single cell graphics characters RUN the following program:

250 FOR I=0 TO 5:K=21:L=128+K: PRINT CHR\$(191);CHR\$(L);CHR\$(191),L: NEXT I

The program generates the appropriate powers of two in K, computes the ASCII code in L and prints the character between two blocks of CHR\$(191) which allows one to appreciate the horizontal and vertical placement of the graphics cell. This program and other demonstrations referred to in the text, are listed in a separate program, Figure 3. The most important line is 275, which lists the rules for the graphics codes.

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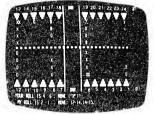
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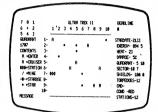
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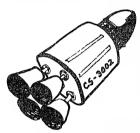


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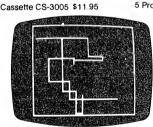
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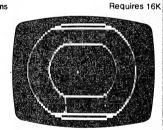
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With the TRS-80, Radio Shack has brought the endless fascination and challenge of personal computing within the financial reach of more people than any other company. For this, countless thousands of us all over the world thank them. Unfortunately, by the same token, we don't thank them for the endless hours of torment and frustration they also gave us with their tape system. For most of us, those countless hours of fiddling with the tiny and almost unreadable volume control dial have sadly diluted our pleasure in using what has to be the ultimate toy of "homo sapiens". Early on, most TRS-80 owners start dreaming of a better program/data storage and retrieval system. There is disk of course. ("You don't have disk?", "You've got to have disk, it's the only way to gol") There is also the incredible Exatron Stringy Floppy.

But hold on a minute. Suppose your means are modest and your 16K Level II system represented just all the big bucks you could spare for a long time? Or suppose that you have other high priority items, like 32K more RAM, which you can get today for under \$200. And who doesn't want a line printer? They seem to be getting cheaper all the time. Nice if you could live with tape and save those bucks for other things, right?

In this article I propose to share the things I have learned about making the tape system easier, more reliable and generally more pleasant to use. I can truthfully say that today I am very happy with my tape system...also with my 48K RAM and versatile little Microline 80 printer...both of which together cost about what I would have had to pay for the expansion interface and just one disk drive - with only the same 16K RAM.

First let's whip the tape load problem. The major cause of unreliable program loading from cassette is volume level variation, in spite of the famous Model I

desensitizing fix. If my recent experience at the neighborhood Radio Shack store is any indication, this is still true with the otherwise vastly improved Model III. (There are also several minor causes which we will discuss in a later issue.) There is a great variation in the recording level of commercially produced tapes. This variation takes the form not only of overall recording level differences among tapes but also of wide volume swings on the same tape from one moment to the next. System tapes are notoriously bad in this respect.

The answer to volume variations is, simply, to provide a meter so that you can literally "see" the volume your recorder is feeding your computer.

That's all any experienced electronics hobbyist needs to be told, but I'm afraid I have already discouraged the many of you who have never done any electronic assembly. Don't worry. There are several ways to skin this cat. I'm a relative greenhorn too, and my way is not elegant, to say the least. It will probably send the electronic whizzkids into gales of laughter. But who cares? It works great.

Figure 1 is a list of the parts you need. The VU Meter last appeared in the 1978 Radio Shack catalog and is getting very hard to find. You may have to locate another electronic parts shop and buy one there. Cost of these items is around \$16.00 or less, if you can get some of that scrap wire the phone company repairmen are always leaving behind. This is the minimum box to get you started.

Mount the jacks in two rows of three along the rear of the black box (Figure 2). Leave room for a top row of three in case you decide to add a second recorder later. The box in Figure 2 has had this third row added. They are *not* required for the configuation we are describing here. Place a subminiature jack in each row, one above the other. Mount the meter in the center top of the box as shown in Figure 3. The momentary "on" switch goes in the

lower right corner of the top. Now you're ready to wire these items as shown in the photo wiring diagram (Figure 4). For the four miniature jacks (the left four), be sure to get positives and negatives connected properly. Positive is the terminal opposite the spring contact which will engage the tip of the plug when it is inserted. The plus terminal on the meter is clearly marked on the back of the meter.

Polarity doesn't matter when connecting the two subminiature jacks on the right. Unfortunately, Radio Shack doesn't seem to offer an "open" (two contact) subminature jack these days. When you are looking at the bottom of the jack, hold the spring contact for the tip in the twelve o'clock position. The two contacts you will use are located at three o'clock and at six o'clock. In the photo we have snipped off the unneeded connectors.

Wish we could talk about soldering technique here, but there isn't space. Don't worry about excess heat. There are no parts you can damage without really trying to.

You could probably use a cardborad box if you had to, and cut the necessary holes with an Xacto knife. I suspect you could wrap the bare wire ends around the contacts and apply liquid solder from a squeeze tube...but don't say I told you to. Just don't short any circuit by letting two bare wires touch. Perhaps you have a friend who can make this box for you. By all means, move heaven and earth to get the thing made. It's really worth the trouble

You'll need three patch cords. Two have miniature plugs on each end, preferably color coded, one pair with red jacks on each end and one pair with black. The third has subminiature plugs on each end. These can be bought if you are not up to making them. Any color will do as long as you remember which is which when you hook them up. Hooking up the box to your TRS-80 is a simple matter. Cassette plugs from the CPU go into the bottom row. Black goes into the

leftmost jack which has the meter across it. Large gray goes into the middle, and small gray goes, naturally into the remaining jack in the bottom row. The black patch cord goes into "Earphone" or "Monitor" on the recorder and into the jack above the black computer plug. The red patch cord goes into "AUX" of course, and into the jack above the large gray computer plug. Where the patch cord with the subminiature plugs goes is pretty obvious. Do what I'm about to tell you now and your tape loading troubles should be about 90% over.

Before you use this rig you must mess up the zero setting on the meter. With a small screwdriver, turn the adjusting screw on the meter face until the needle goes as high as you can get it. This will probably be a bit below -7 if you are using the Radio Shack meter we listed. Who cares about accurate decibel readings anyway? You just want to watch the needle move...and move with maximum sensitivity to the volume output of the recorder. There are probably some other meters that would be a little more elegant, plus adding some electronic gadgets to the circuit. But let's not get technical, OK?

Now you are ready for business. Get out the easiest loading tape you have. I hope you have one! This will be your calibration standard. Load it into the recorder and press "PLAY". The recorder will only play as long as you hold the momentary button down. You aren't CLOADing at this point, just metering the recorder signal. If the volume is high enough, the meter needle will move when the tape is playing. With one finger on the button, and the program (not necessarily from the start) passing the tape head, adjust the volume control until you get about a -3 reading. This assumes your "silent" setting is a little less than -7 as we said above.

Take your finger off the button and rewind the tape, using the button again if your recorder won't rewind without this help. Now try a CLOAD. Lot's of luck. You now do this same thing several times, "listening" (looking at the meter) to the tape volume and adjusting for a different meter reading each time. Test each setting by attempting a CLOAD. If this sounds laborious, remember, you're calibrating your meter. It's a once in a lifetime job.

For your guidance in diagnosing the numerous failures you are bound to get when you are above or below the good range, I offer the following:

VOLUME MUCH TOO HIGH: No stars in the corner.

VOLUME SOMEWHAT TOO HIGH: Two unblinking stars.

VOLUME A TRIFLE LOW: An apparent good load that displays "garbage" when you try to LIST it.

VOLUME MUCH TOO LOW: No stars in the corner.

I sure hope your easy loading standard tape isn't too long!

When you are through with the above ordeal you will have found the upper and lower limits of the meter readings which give you good loads. Be sure to write them down. You will soon have them memorized, but in the meantime you will need to refer to your written observations. Your ideal CLOADing volume is right in the middle of this range. This you will memorize instantly. Now the fun really begins!

Try some store-bought tapes...some system tapes, if you have any. Remember to check their recording level first without CLOAD as we did above. Surprise! They are all over the lot, aren't they? You now can make them behave by adjusting the volume during a test "play" so the meter hangs in there on your "ideal"

PARTS LIST

Figure 1

ITEM	RADIO SHACK #	APPROX COST
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Figure 2
End view of meter box

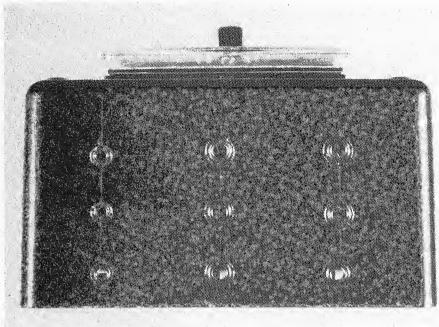
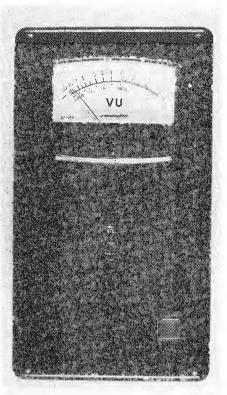


Figure 3
Top view of wired box



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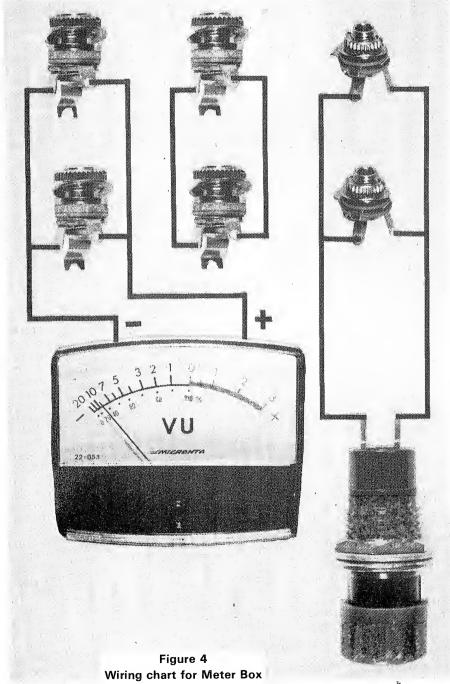
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Circle 51

volume. Some system tapes will "yo-yo" up and down the dial. For these you must set the volume so that the needle moves back and forth within the "good" range you so laboriously discovered during your calibration chore. Darned critical, isn't it? How did you ever find just that spot on the little black dial without the meter? Now you see why you have had all that hassle with system tapes in the past.

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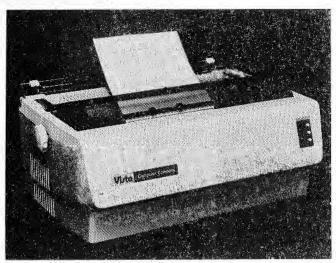
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Vista's Daisy Wheel Printer

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80-U.S. Staff

At a recent visit to a Radio Shack computer center we had the chance to sit down and do a series of evaluations on new products. One of our first was to evaluate printer throughput. We did this on all the printers available at the time and the results are included in Figure 1.

The Line Printer VII

In the process of the printer tests, we got a good look at the Line Printer VII. This little unit is a bargain at \$399.00 for the person who cannot afford a larger, more expensive printer.

It prints 80 characters per line and the throughput shows it was rated as well as any dot matrix printer. It is small and must be used with tractor paper. The ribbon is a bear to load; both a technician and a salesman worked for about ten minutes before the ribbon was in and functional. All this says is that Radio Shack made the ribbon a little tight. We think that most people will get the hang of it after they do it once or twice.

The print quality is less than desired from this single pin matrix head. It is somewhat fuzzy around the edges and not as crisp as can be obtained from printers of this type.

In the meantime, it is worth the price if you can't afford more...but don't expect letter quality.

The Daisy Wheel II

One of the most powerful printers

Radio Shack marketed to date has to be the Daisy Wheel II. This printer was forced on Radio Shack when Data Products couldn't produce enough Diablo-style printers to fill the demand. The original Daisy Wheel I also had problems that caused most technicians to shudder whenever they saw one coming in for delivery. Most glaring was the problem of tearing ribbons. It was also very noisy.

Radio Shack contracted with a Japanese firm, Ricoh, to produce the new Daisy Wheel II. While waiting for first deliveries, the company contracted with Qume to fill the back orders when Data Products couldn't deliver. The Qume was also noisy and tore up ribbons.

FIGURE 1 RESULTS OF THROUGHPUT TESTS

Printer Make & Model	Rated CPS	Labels CPS	20 CPL CPS	40 CPL CPS	80 CPL CPS	Forms CPS	Average CPS			ional
RS LPII	100	30.0	28.6	38.5	47.6	16.7	32.4	32.4	N	Note 1
" LPIII	120	70.6	62.5	90.9	100.0	36.6	72.1	60.1	Υ	
" LPIV	50	22.6	22.6	27.0	31.3	13.3	23.7	46.7	N	
" LPV	160	75	71.4	90.0	111.1	36.6	62.2	38.8	Υ	
" LPVI	100	57.1	50	66.7	76.9	30	56.1	56.1	Υ	
" LPVII	30	17.1	17.5	21.7	25	9.4	18.1	60.5	N	
" DWII-12 CPI	43	42.0	40	45.5	45.5	34.4	41.7	96.9	N	Note 2
" DWII-10 CPI	43	41.4	40	43.5	43.5	33.4	40.4	94.9	N	
Centronics 702	120	66.7	58.8	71.4	83.3	46.8	65.4	54.5	Υ	
Starwriter I	25	27.3	27	27.8	27.8	21.3	26.2	104.8	Υ	

Notes: 1 - RS is Radio Shack; LP is Line Printer.

2 - DW is Daisy Wheel; CPI is characters per inch.

The new Daisy does not use a Diablo-style wheel as the previous models did. This limits the choice of type styles, but that should be a small matter as most users do not change wheels very often. The ribbon is a one pass carbon, producing high quality results. At this point however, that ribbon needs some work.

Most carbon ribbons used in Daisy Wheel printers are multi-strike. That is, they advance less than one character width to optimize ribbon useage. This results in the same area

"...the Daisies were easily at or better than, their rated speeds."

of the ribbon being used two to five times. As a result, we experienced some weakness in print quality, although sharpness was not lost.

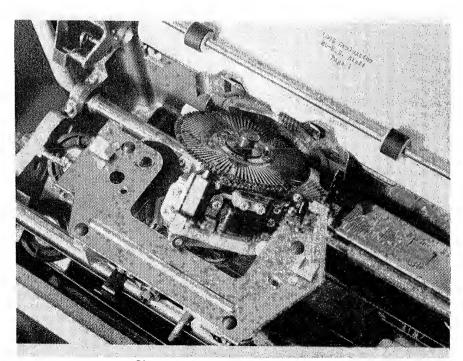
The performance and speed of this printer were impressive. While not a particularly quiet printer, it does have to rank as being less noisy than its two predecessors. It is rated at 43 characters per second, which it achieved without difficulty in the throughput tests. Actual burst speed is probably close to that or better, and it slews to the next print position while printing text with spaces. Also, during top of form paper advances, the print head will be positioned at the column location of the next line of print while the paper is still in motion. This accounts for its excellent throughout ratio for forms.

The Daisy Wheel II specifications are impressive: 43 cps (characters per

(text continued on page 83)



Radio Shack's new Line Printer V looks like the Line Printer III



Close-up of the Starwriter I Printer mechanism and wheel

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10 CLEAR 1000 20 A\$="ABCDE FGHIJ KLMNO PQRST UVWXY ZO1 23 45678 9!#\$% &*()- +=j*: ;.><, ?/abc d efg hi" 30 B\$=LEFT\$(A\$,40) 40 C\$=LEFT\$(A\$,20) 50 D\$=LEFT\$(A\$,30) 51 E\$="TEST NUMBER ONE: LABELS #### SECONDS; ###.# CHARS PER SEC OND" 52 F\$="TEST NUMBER TWO: 20 CHAR/LINE #### SECONDS; ###.# CHARS PER SEC OND" 53 G\$="TEST NUMBER THREE: 40 CHAR/LINE #### SECONDS; ###.# CHARS PER SEC 54 HS="TEST NUMBER FOUR: 80 CHARS/LINE #### SECONDS; ###.# CHARS PER SEC OND" 55 I\$="TEST NUMBER FIVE: FORMS #### SECONDS; ###.# CHARS PER SEC OND" 60 PRINT"ENTER PRINTER DESCRIPTION"; 7U INPUT DS\$ 80 PRINT"ENTER ADVERTISED CPS"; 85 INPUT CP 90 PRINT"STARTING TESTS" 95 GOSUB 100 : GOTO 110 100 SYSTEM "TIME 00.00.00" 105 RETURN 110 FOR A=1 TO 10 120 FOR B=1 TO 4 130 LPRINT D\$ 140 NEXT B 150 LPRINT" " 160 LPRINT" " 170 NEXT A 175 GOSUB 180 : GOTO 210 180 LPRINT" ":TF\$=TIME\$ 190 T=(VAL(MID\$(TF\$,4,2))*60)+(VAL(MID\$(TF\$,7,2))) 200 RETURN 210 T1=T 220 GOSUB 100 230 FOR A=1 TO 50 240 LPRINT C\$ 250 NEXT A 260 GOSUB 180 270 T2=T 280 GOSUB 100 290 FOR A=1 TO 25 300 LPRINT B\$ 310 NEXT A 320 GOSUB 180

330 T3=T 340 GOSUB 100 350 FOR A=1 TO 12 360 LPRINT A\$ 370 NEXT A 380 LPRINT B\$ 390 GOSUB 180 400 T4=T 410 LPRINTCHR\$(12); 420 GOSUB100 430 FOR A=1T03 440 FOR B=1T04 450 LPRINTTAB(25)D\$ 460 NEXTB 470 LPRINT" " 480 LPRINTTAB(60)C\$ 490 LPRINT" " 500 FOR B=1T03 510 LPRINT D\$ 520 NEXT B 530 LPRINT" " 540 FOR B=1T04 550 LPRINT C\$; TAB(50)C\$ 560 LPRINT" " 570 NEXT B 580 LPRINTCHR\$(12); **590 NEXT A** 600 GOSUB 180 610 T5=T 620 CLS 630 PRINT"RESULTS FOR "DS\$" RATED AT "CP " CHAR. PER SECOND" 640 LPRINT"RESULTS FOR "DS\$" RATED AT "C P" CHAR. PER SECOND" 650 PRINT:LPRINT" " 660 PRINTUSINGE\$;T1;1200/T1 670 LPRINTUSINGE\$;T1;1200/T1 680 PRINTUSINGF\$;T2;1000/T2 690 LPRINTUSINGF\$;T2;1000/T2 700 PRINTUSINGG\$; T3; 1000/T3 710 LPRINTUSINGG\$;T3;1000/T3 720 PRINTUSINGH\$;T4;1000/T4 730 LPRINTUSINGH\$; T4; 1000/T4 740 PRINTUSINGI\$; T5; 1170/T5 750 LPRINTUSINGI\$; T5; 1170/T5 760 LPRINTCHR\$ (12) 770 END 1000 FOR A=32 TO 254 1020 LPRINTUSING" #### \ \";A;CHR\$(A); 1025 IF AMOD10=0 THEN 1050 1030 NEXT A 1040 STOP 1050 LPRINT

1060 GOTO 1030

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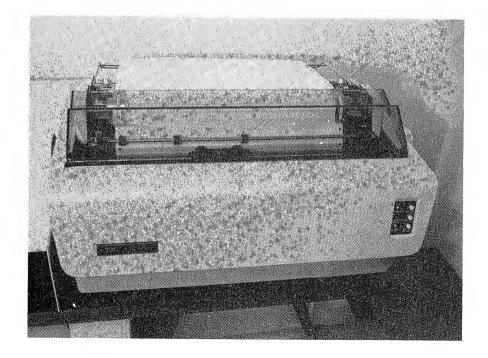
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C. Itoh Starwriter I 25 cps bi-directional Daisy Wheel Printer

second) rated and measured at 43.5 on 10 cpi (characters per inch) and proportional spacing and 45.5 cps for 12 cpi. The carriage return speed for this single directional printer is rated at 300 milliseconds for 13.6 inches of head movement. This rating must be close to accurate as the throughput measurements are excellent.

Line feed can be set to either 1/12 or 1/6 of an inch, which corresponds to half or full typewriter line spacing. The actual printer wheel has 124 character positions with three wheels being available at the time of this writing.

Characters per line are 136 for 10 cpi and 163 for 12 cpi. There are three levels of impression available and the print wheel life is rated at 40 million characters. Ribbon life is rated at 270,000 characters. The interface is 8-bit parallel data with strobe conforming to Centronics standards. A character set beyond the standard ASCII set is supported.

All switch settings except impression can be controlled by software from a Basic program. Reverse paper movement can be controlled in both full reverse line feed and reverse half-line feed increments which will allow superscripting and subscripting. Also, head movement may be controlled in increments down to 1/60 of an inch.

It is our opinion that the Daisy Wheel II represents the best value among the Daisies. The objection of a limited number of wheels to choose from will affect few users.

The TEC FP-1500 Starwriter I

We obtained this printer from Lords Corp over four months ago and have been putting it through its paces. It has become the real workhorse for inhouse word processing needs and program listings for publication.

The Daisy Wheel II notwithstanding, this printer also represents an excellent buy. Though it runs slower than the Daisy Wheel II at 25 cps rated, 25.5 cps throughput tested, it nevertheless turns in an admirable performance. The accompanying photo shows it to be well constructed and we have had no problems with the ribbon. It is hard to criticize this printer. It does its job and does it well.

The specifications are as follows: 25 cps on 136 character print line at 10 cpi, and 163 characters per line at 12 cpi. Print spacing down to 1/20 of an inch and line spacing down to 1/48 of an inch, software controllable. It uses standard Diablo plastic print wheels with 96 characters. The interface is standard Centronics parallel. It can use a carbon multi-strike or fabric ribbon interchangeably.

The included manual is well written. The printer, manufactured by C. Itoh Electronics, Inc, is the same printer that is sold by a number of vendors. VISTA also markets this unit under their name.

The Daisy Wheel II from Radio Shack has a high speed return and requires a very solid table or stand. The Starwriter is bi-directional and quite stable. Thus, it does not require as solid, a table or stand and can be easily placed next to your computer without shaking things while printing. Noise level appears to be similar to that of the Daisy Wheel II.

We did not test the higher speed Starwriter, but can report that it supports proportional spacing and sports a 45 cps print speed.

The Line Printer V

The Line Printer V is a faster version of the Line Printer III and has a couple of additional features. For one thing, it supports a better looking lower case as well as a complete graphics set

similar to the Line Printer VI. Also, the top switch panel was redesigned and it is much harder to accidently knock this printer off line than the Line Printer III.

Like most of the other dot matrix designs we tested, this printer also does poorly in throughput. We have yet to come up with a plausible answer for this difference in ratings.

"Without a doubt, the results will be a shock to many people who have gone along with the idea that a 160 cps printer actually prints at 160 cps."

Printer Throughput Tests

The numbers in Figure 1 represent actual times as recorded by the Model Il test in the listing. Whether the discrepancies are the result of a different method of measuring characters per second, or some other fault of which we don't know, we decided to go ahead and publish these early findings with the request that you, our readers and advertisers make the same tests and send us your results. If you have a program which results in more accurate readings, let us know. Without a doubt, the results will be a shock to many people who have gone along with the idea that a 160 cps printer actually prints at 160

After consideration of varying applications in which a printer would be used, the following criteria was established.

1. Printing of labels: A typical label contains a maximum of 4 lines of thirty characters with spaces. The actual label is six lines long. In practice a label is probably closer to three lines of 25 characters. However, some printers complete a full line motion as if printing to initiate a line feed, so we chose 4 lines of 30 characters (the last being a space) for the test and

produced 10 labels, or 1200 characters. This would represent the worst case for labels.

- 2. Short, medium and long lines of groups of characters followed by a space were chosen to represent text printing of listings, letters, etc. In each case, 1000 characters were produced.
- 3. Forms are often printed in small businesses, the most common being a statement. This one contains a header, an address block, a date and four lines of detail followed by a top-of-form. Page length is standard at 66 lines and three forms, for a total of 1000 characters.

The Results

Actual measured results showed that the dot matrix group as a whole only produced 75% of the rated speed for bi-directional printers, while single direction units accomplished only 60%. The Centronics group represented by the 702 and the Line Printers II and IV from Radio Shack did the poorest, while the Daisies were easily at or better than their rated speeds.

These figures are not, by any means complete. This month's reader service card has a place for you to send in your results of the same test. Model I and III users will want to modify the Time sections of the program to obtain the needed results and may have to use a stop watch for rough timing.

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The "What's on the right of the cursor?" EDIT Mode. Come on. You don't need to put up with this half-blindness when editing a program. If the statement is listed on the screen (even a multi-liner), OMNI-KEY lets you edit it in place and in full view with its movable cursor. And you don't need any fancy commands to do

it, either. To insert characters, just type them -- the lines will shift to accommodate them. Deletions are even easier -- just hit the *CLEAR* key. Need to move a statement? Just edit the line number! It's that easy.

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Simplicity. That's the power of OMNI-KEY. It's simple, it's easy to live with, and it lets you, the programmer, do what you do best. Program. Without the tedium, without the aggravation, and, best of all, without spending a lot of bucks. At only \$23, OMNI-KEY has got to be the best deal going! And if you're a mere human, that's something to think about.

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Have you ever had the urge to catch a falling star? Well, here is your chance. For openers, go out and look up into the sky.

Now that you have had the opportunity to look at the real thing, power up your Model I, III, or Color Computer and key in the following program. For Models I and III, memory must be set at 32511 for 16K or 45000 for Disk. The Color Computer does not require any memory reservation.

The Color Computer listing is done in 32-character lines for ease of entry. While the listing is shorter, it will not give quite the same results. For one thing, it runs slower. A complete explanation of all the differences is included in the Color Computer article in this issue.

Sundance is a relatively simple game, consisting of two to four suns which bounce back and forth between two 3 X 3 grids viewed in perspective. If a sun bounces off the upper far left block on the grid, it will bounce on the far left block of the lower grid. The object of the game is to capture as many suns as possible in a given length of time by opening a hatch in the lower grid at the right time. The instructions will display which keys to use.

Sound is provided through the television speaker for Color Computer users and through the cassette port for Model I and III users.

Listing 1
TRS-80 16K Tape Model I/III

SUNDANCE 16k Tape Version

10 REM * SUNDANCE * VERSION 4.1 * 29-DE CEMBER-1980 *

20 REM * COPYRIGHT 1980 * A JON WAPLES PRODUCTION *

30 REM * DON'T FORGET TO SET MEMORY SIZ E AT 32511! *

40 REM * INITIALIZE VARIABLES *

50 RANDOM:CLEAR1125:DEFINTA-B,E-F,J-Q,V-Z:DEFSNGC:DEFSTRD,G-I,R-U

60 T1=CHR\$(168)+CHR\$(151)+STRING\$(4,131)+CHR\$(139)+CHR\$(132)+CHR\$(170)+CHR\$(149)+CHR\$(149)+CHR\$(149)+CHR\$(170)+CHR\$(149)+CHR\$(159)+CHR\$(180)+CHR\$(195)+CHR\$(170)+CHR\$(149)+CHR\$(170)+CHR\$(151)+STRING\$(3,131)+CHR\$(139)+CHR\$(180)+CHR\$(194)+CHR\$(160)+CHR\$(158)

70 T1=T1+STRING\$(2,131)+CHR\$(173)+CHR\$(
144)+CHR\$(128)+CHR\$(170)+CHR\$(159)+CH
R\$(180)+CHR\$(195)+CHR\$(170)+CHR\$(149)
+CHR\$(168)+CHR\$(151)+STRING\$(4,131)+C
HR\$(139)+CHR\$(132)+CHR\$(170)+CHR\$(151)
+STRING\$(5,131)+CHR\$(129)

Add POWER to your TRS-80°

SOFTWARE by MiProg

XEDIT, a high powered compact disk besed editor designed for the TRS-80. Model I or II. Whether it is BASIC, ASSEMBLY, or FORTRAN, XEDIT is pecked full of commends needed by programmers who ere serious about their work. Here ere just a few features:

- Edits most file formats
- Block text copy command
- · Locate, Delete, and Chenge with windows
- Inserts and maps up to five input files
- Upper/lower case competible
- Operates with or without line numbers
- · Rapid access disk cache
- Recovers from most DOS errors
- · Fast file entry point map
- Change text command for any number of occurrences
- DOS Directory and Kill commands
- · Line printer paging with adjustable forms
- Sophisticated reprinting line editor, handles line feeds
- Disk BASIC, Disk EDTASM, and EDIT-80 format compatible
- Display status command, includes free memory, current pointer printer forms, number of input files, output filename and format.

XEDIT will handle files of any size up to 2.7 Megabytes or 10K lines in length. Comes complete with instructions covering operation, externals, end file formats.

Model I (32K single disk system)	
Formatted diskette	\$44.95
Cassette tape	\$39.95
Model II	
Formatted diskette	\$89.95
Model III (32K single disk system)	
Formatted diskette	\$79.95
Cassette tape	\$75.95

ASM/CMD, a disk based assembler which generates object code to disk or tape (disk only on Model II). Accepts any file format including ASCII Disk BASIC. Listing may be outputted to display, disk file, or paged with edjustable forms to printer. Operates under standard Z80 Zilog Mnemonics with 9 pseudo operations. Comes complete with operating manual.

Model I (16K single disk system)	
Formatted diskette	\$34.95
Cassette tape	\$29.95
Model II Formatted diskette	\$59.95
Model III (32K single disk system)	
Formatted diskette	\$49.95
Cassette tape	\$45.95

PACK/CMD removes spaces from text files generated by XEDIT, and EDIT-80 to reduce file lengths by 5 to 40 percent. PACK will also strip comment fields and line numbers for additional space savings. Text can be masked for upper case only. Does not destroy compatibility of assembly and FORTRAN source files. Comes complete with instructions.

	ystem) 	
Model II Formatted diskette		\$19.95
	system)	

Special packege, XEDIT, ASM, and PACK.

-p p g-,	٠,	•		.,	_	 -	•	 ٠.	٠.								
Model I																	
Formatted diskette																	\$79.95
Cassette tape																	\$74.95
Model II																	
Formatted diskette																	\$149.95
Model III																	
Formetted diskette																	\$129.95
Cassette tepe																	\$125.95

XDIR/CMD, en extended directory that offers more than the standard TRSDOS (m) directory. XDIR will do multiple drive directories with ell file ettributes including extent locations, file length, EOF index, EOF record, protection level, LRL, password indication, track lockout indication, and much more. XDIR will also display to the printer.

Model I (16K disk system))												
Formatted diskette													\$19.95
Cassette tape													\$15.95

CALL/CMD extends and improves the TRSDOS AUTO function. Can be enabled and disabled by prompts, and through keyboard, resident program, or the call file.

Model I (16K single disk system)	
Formatted diskette	\$19.95
Cassette tape	\$15.95

TANDON/CMD improves TRSDOS by allowing higher step rate, extending access to 40 tracks for the new Tandon disk drives. Also fixes the break key problem.

Model I (16K single disk sy	ysten	n)								
Formatted diskette				 						\$14.95
Cassette tape				 						\$ 9.95

DEXER/CMD, a disk exerciser emulator program designed to speed repair of any TRS-80 compatible disk drive. DEXER eliminates the need for the Shugart SA809 test fixture and decreases repair time with easy to use commands and on screen display of required set up data. DEXER was written specifically for the repair technician and Shugart or Tandon disk drives. Shugart alignment diskette or equivalent and a 30Mhz oscilloscope required. One key commands allow easier adjustments necessary for Shugart alignment. DEXER is not for general disk testing and is recommended only for service personnel who have previous experience in disk drive repair.

Model I (16K single disk s	ys	te	m	ı)											
Formatted diskette															\$24.95
Cassette tape															\$19.95

Dip shunts for conversion and upgrades for the TRS-80 $^{\text{IM}}$. Comes complete with instructions for A, D, E, and G level boards and new 2 chip level II.

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- 80 T2=CHR\$(130)+CHR\$(173)+STRING\$(4,176)+CHR\$(144)+CHR\$(128)+CHR\$(170)+CHR\$(149)+CHR\$(149)+CHR\$(149)+CHR\$(149)+CHR\$(130)+CHR\$(173)+CHR\$(144)+CHR\$(128)+CHR\$(170)+CHR\$(144)+CHR\$(149)+CHR\$(149)+CHR\$(170)+CHR\$(170)+CHR\$(170)+CHR\$(149)+CHR\$(149)+CHR\$(149)+CHR\$(149)+CHR\$(149)+CHR\$(148)
- 90 T2=T2+CHR\$(151)+CHR\$(196)+CHR\$(171)+ CHR\$(148)+CHR\$(170)+CHR\$(149)+CHR\$(13 O)+CHR\$(173)+CHR\$(144)+CHR\$(128)+CHR\$ (170)+CHR\$(149)+CHR\$(170)+CHR\$(149)+C HR\$(198)+CHR\$(170)+CHR\$(181)+STRING\$(5,176)+CHR\$(144)
- 100 T3=CHR\$(198)+CHR\$(171)+CHR\$(148)+CH
 R\$(170)+CHR\$(149)+CHR\$(196)+CHR\$(170)
 +CHR\$(149)+CHR\$(170)+CHR\$(149)+CHR\$(1
 94)+CHR\$(139)+CHR\$(180)+CHR\$(170)+CHR
 \$(149)+CHR\$(170)+CHR\$(149)+CHR\$(196)+
 CHR\$(170)+CHR\$(149)+CHR\$(170)+CHR\$(15
 1)+STRING\$(4,131)+CHR\$(171)
- 110 T3=T3+CHR\$(149)+CHR\$(170)+CHR\$(149) +CHR\$(194)+CHR\$(139)+CHR\$(180)+CHR\$(1 70)+CHR\$(149)+CHR\$(170)+CHR\$(149)+CHR \$(198)+CHR\$(170)+CHR\$(149)+CHR\$(198)
- 120 T4=CHR\$(136)+CHR\$(180)+STRING\$(4,176)+CHR\$(186)+CHR\$(133)+CHR\$(138)+CHR\$(181)+STRING\$(4,176)+CHR\$(186)+CHR\$(1 33)+CHR\$(170)+CHR\$(149)+CHR\$(195)+CHR\$(130)+CHR\$(175)+CHR\$(149)+CHR\$(170)+CHR\$(181)+STRING\$(3,176)+CHR\$(184)+CHR\$(135)+CHR\$(128)+CHR\$(170)
- 130 T4=T4+CHR\$(149)+CHR\$(196)+CHR\$(170) +CHR\$(149)+CHR\$(170)+CHR\$(149)+CHR\$(1 95)+CHR\$(130)+CHR\$(175)+CHR\$(149)+CHR \$(138)+CHR\$(181)+STRING\$(4,176)+CHR\$(184)+CHR\$(132)+CHR\$(170)+CHR\$(181)+ST RING\$(5,176)+CHR\$(144)
- 140 U1=CHR\$(139)+CHR\$(147)+STRING\$(19,1 31)+CHR\$(151)+STRING\$(18,131)+CHR\$(17 1)+STRING\$(19,131)+CHR\$(163)+CHR\$(135)
- 150 U2=CHR\$(130)+CHR\$(164)+CHR\$(210)+CH R\$(170)+CHR\$(210)+CHR\$(149)+CHR\$(210) +CHR\$(152)+CHR\$(129)
- 160 U3=CHR\$(137)+STRING\$(18,176)+CHR\$(1 81)+STRING\$(16,176)+CHR\$(186)+STRING\$ (18,176)+CHR\$(134)
- 170 U4=CHR\$(130)+CHR\$(164)+CHR\$(208)+CH R\$(170)+CHR\$(208)+CHR\$(149)+CHR\$(208) +CHR\$(152)+CHR\$(129)
- 180 U5=CHR\$(137)+CHR\$(144)+CHR\$(207)+CH R\$(149)+CHR\$(206)+CHR\$(170)+CHR\$(207) +CHR\$(160)+CHR\$(134)
- 190 U6=CHR\$(130)+CHR\$(167)+STRING\$(14,1 31)+CHR\$(171)+STRING\$(14,131)+CHR\$(15

- 1)+STRING\$(14,131)+CHR\$(155)+CHR\$(129)
- 200 U7=CHR\$(137)+CHR\$(144)+CHR\$(205)+CH R\$(149)+CHR\$(204)+CHR\$(170)+CHR\$(205) +CHR\$(160)+CHR\$(134)
- 210 U8=CHR\$(130)+STRING\$(40,131)+CHR\$(1 29)
- 220 D1=CHR\$(160)+STRING\$(40,176)+CHR\$(1 44)
- 230 D2=CHR\$(152)+CHR\$(129)+CHR\$(205)+CH R\$(149)+CHR\$(204)+CHR\$(170)+CHR\$(205) +CHR\$(130)+CHR\$(164)
- 240 D3=CHR\$(160)+CHR\$(182)+STRING\$(14,176)+CHR\$(186)+STRING\$(14,176)+CHR\$(18 1)+STRING\$(14,176)+CHR\$(185)+CHR\$(144)
- 250 D4=CHR\$(152)+CHR\$(129)+CHR\$(207)+CH R\$(149)+CHR\$(206)+CHR\$(170)+CHR\$(207) +CHR\$(130)+CHR\$(164)
- 260 D5=CHR\$(160)+CHR\$(134)+CHR\$(208)+CH R\$(170)+CHR\$(208)+CHR\$(149)+CHR\$(208) +CHR\$(137)+CHR\$(144)
- 270 D6=CHR\$(152)+STRING\$(18,131)+CHR\$(1 51)+STRING\$(16,131)+CHR\$(171)+STRING\$ (18,131)+CHR\$(164)
- 280 D7=CHR\$(160)+CHR\$(134)+CHR\$(210)+CH R\$(170)+CHR\$(210)+CHR\$(149)+CHR\$(210) +CHR\$(137)+CHR\$(144)
- 290 D8=CHR\$(184)+CHR\$(177)+STRING\$(19,1 76)+CHR\$(181)+STRING\$(18,176)+CHR\$(18 6)+STRING\$(19,176)+CHR\$(178)+CHR\$(180)
- 300 H(1,1)=CHR\$(184)+STRING\$(14,191)+CH R\$(149)
- 310 H(1,2)=CHR\$(160)+CHR\$(190)+STRING\$(15,191)
- 320 H(2,1)=STRING\$(14,191)
- 330 H(2,2)=CHR\$(186)+STRING\$(14,191)+CH R\$(181)
- 340 H(3,1)=CHR\$(170)+STRING\$(14,191)+CH R\$(180)
- 350 H(3,2)=STRING\$(15,191)+CHR\$(189)+CH R\$(144)
- 360 H(4,1)=CHR\$(184)+STRING\$(16,191)+CH R\$(149)
- 370 H(4,2)=CHR\$(160)+CHR\$(190)+STRING\$(17,191)
- 380 H(5,1) = STRING * (16,191)
- 390 H(5,2)=CHR\$(170)+STRING\$(16,191)+CH R\$(149)
- 400 H(6,1)=CHR\$(170)+STRING\$(16,191)+CH R\$(180)
- 410 H(6,2)=STRING\$(17,191)+CHR\$(189)+CH R\$(144)
- 420 H(7,1)=CHR\$(184)+STRING\$(18,191)+CH R\$(151)

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```
430 H(7,2)=CHR$(160)+CHR$(190)+STRING$(
  19,191)
440 H(7,3)=CHR$(184)+STRING$(20,191)+CH
  R$ (181)
450 H(8,1)=STRING$(18,191)
460 H(8,2)=CHR$(170)+STRING$(18,191)+CH
  R$(149)
470 H(8,3)=STRING$(20,191)
480 H(9,1)=CHR$(171)+STRING$(18,191)+CH
  R$(180)
490 H(9,2)=STRING$(19,191)+CHR$(189)+CH
  R$ (144)
500 H(9,3)=CHR$(186)+STRING$(20,191)+CH
  R$ (180)
510 SO=CHR$(25)+CHR$(255)
520 S1=CHR$(50)+CHR$(20)
530 S2=CHR$(50)+CHR$(40)
540 S3=CHR$(50)+CHR$(60)
550 S4=CHR$(50)+CHR$(80)
560 S5=CHR$(50)+CHR$(100)
570 S6=CHR$(50)+CHR$(120)
580 S7=CHR$ (50)+CHR$ (140)
590 S8=CHR$(50)+CHR$(160)
600 S9=CHR$(50)+CHR$(180)
610 R1="SCORE: ###"
620 R2="TIME: #:##"
630 A2=30
640 A4=2
650 C1=30.5
660 P1=402
670 P2=414
680 P3=429
690 P4=207
700 P5=223
710 P6=240
720 P7=77
730 P8=96
740 P9=114
750 REM * POKE IN SOUND ROUTINE *
760 RESTORE: FORN1=32512T032578: READN2: P
  OKEN1,N2:NEXTN1
770 IFPEEK(16396)=201THENPOKE16526,0:P0
  KE16527,127ELSEDEFUSR=&H7F00:CMD"T"
780 DATA205,127,10,126,50,66,127,35,94,
  35,86,235,43,58,64,56,203,87,192,58,6
  6,127,183,200,61,200,61,50,66,127,35,
  86,30,0,35,70,62,1,211,255,16,254,70,
  60,211,255,16,254,70,122,183,32,7,123
   ,183,40,212,61,40,209,27,27,16,241,24
   ,225,0
790 REM * INTRODUCTION *
800 CLS:PRINT@384,T1;:PRINT@448,T2;:PRI
  NTa512, T3;: PRINTa576, T4;
```

810 S=CHR\$(1)+CHR\$(255):FORN1=1T05:PRIN

Ta281,"copyright 1980";:printa725,"A

```
JON WAPLES PRODUCTION";:FORN2=1TO20:X
  =USR(VARPTR(S)):FORN3=1T03:NEXTN3,N2:
  PRINTa281, CHR$ (206); :PRINTa725, CHR$ (2
  15);:FORN2=1TO50:NEXTN2,N1
820 CLS:FORN1=1T075+RND(25):PRINT@RND(1
  022),".";:NEXTN1:GOSUB1990
830 REM * INSTRUCTIONS? *
840 PRINT@448,"DO YOU WANT INSTRUCTIONS
850 I=INKEY$:IFI=""THEN850ELSEIFI="Y"TH
  EN870ELSEIFI="N"THEN1060ELSE850
860 REM * INSTRUCTIONS *
870 PRINTa448,"
   ";:GOSUB1990
880 PRINTal, "SUNDANCE IS A RELATIVELY S
  IMPLE GAME. IT CONSISTS OF 2-4 SUNS"
890 PRINT@66,"THAT BOUNCE BETWEEN 2 3X3
   GRIDS VIEWED IN PERSPECTIVE. IF A";
900 PRINTa132, "SUN BOUNCES OFF THE UPPE
  R-FAR-LEFT BLOCK ON THE GRID, IT";
910 PRINTa197,"WILL THEN BOUNCE OFF THE
   LOWER-FAR-LEFT BLOCK, GET IT?";
920 PRINT@263,"THE OBJECT OF THE GAME I
  S TO CATCH AS MANY SUNS AS";
930 PRINT@328,"POSSIBLE. TO DO THIS YO
  U OPEN A HATCH, 1 OUT OF";
940 PRINT@394,"9 LOCATED ON THE LOWER G
  RID. USE THESE KEYS";
950 PRINT@459,"TO OPERATE THE HATCHES:
        PRESS ENTER.";
960 PRINTa594,"7";:PRINTa607,"8";:PRINT
  a621,"9";:PRINTa780,"4(OR U)";:PRINTa
  796,"5(OR I)";:PRINT@813,"6(OR O)";:P
  RINT@906,"1(OR J)";:PRINT@924,"2(OR K
  )";:PRINT@943,"3(OR L)";
970 I=INKEY$:IFI=""THEN970ELSEIFI=CHR$(
  13) THEN980ELSE970
980 GOSUB1990:PRINTa1,"IF YOU HAVE A NU
  MERIC KEYPAD, USE THE KEYS NOT IN PAR
  ENTHESIS.";
990 PRINTa66,"IF YOU DO NOT, USE: 7, 8
  AND 9 PLUS THE KEYS IN PARENTHESIS.";
1000 PRINT@132,"YOU DO NOT HAVE TO PRES
  S ENTER AT ALL AFTER THE GAME BE-";
1010 PRINT@197,"GINS. PLUG THE AUX PLU
  G OF YOUR COMPUTER INTO A SMALL";
1020 PRINT@263,"AMPLIFIER TO GET SOUND.
```

PRESS ENTER.";

80-U.S. Journal Jul/Aug 1981

1030 PRINTa594,"7";:PRINTa607,"8";:PRIN

Ta621,"9";:PRINTa780,"4(OR U)";:PRINT

a796,"5(OR I)";:PRINTa813,"6(OR O)";:

PRINT@906,"1(OR J)";:PRINT@924,"2(OR

K)";:PRINT@943,"3(OR L)";

Labyrinth is not easy. Waking a sleeping watch-dragon is the least of your troubles. Somewhere in this nightmare of tunnels lurks an evil minotaur. To escape, you must kill it. And survive.

Only the legendary light sabre of Dnev can kill the minotaur. It is secreted away in stygian darkness. To get it, you must deal with cave bears, gnomes, pits, wraiths, and much more. You must avoid the minotaur at all

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DEATHMAZE 5000 places you in a gigantic five-story building. There is only one goal. ESCAPE ALIVE! Monsters, dogs, vampires, and other vile horrors will plague your every step as you struggle to survive one of the most challenging adventures ever written. As of December 20, only two people outside the Med Systems' staff were known to have escaped!

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- 1040 I=INKEY\$:IFI=""THEN1040ELSEIFI=CHR \$(13)THEN1060ELSE1040
- 1050 REM * NUMBER OF SUNS? *
- 1060 PRINT@448,"
 - ";:GOSUB1990:PRINT@448,"NUMBER OF S UNS?";
- 1070 I=INKEY\$:IFI=""ORI<"2"ORI>"4"THEN1 070
- 1080 A3=VAL(I):PRINT@448,"
- ";:GOSUB1990:GOSUB2030:S=CHR\$(32)+C HR\$(10)+CHR\$(32)+CHR\$(50)
- 1090 REM * START MAIN LOOP *
- 1100 PRINT@448,;:PRINTUSINGR1;A1;:PRINT @502,;:PRINTUSINGR2;A4,A2;
- 1110 IFB(1)=OTHEN1140
- 1120 PRINT@P1,CHR\$(Q1);:IFP1=402THEN01= 64:X=USR(VARPTR(S0))ELSEIFP1=594THEN0 1=-64:X=USR(VARPTR(S0))
- 1130 P1=P1+01:Q1=PEEK(15360+P1):PRINT@P
- 1140 IFB(2)=OTHEN1170
- 1150 PRINT@P2,CHR\$(Q2);:IFP2=414THEN02= 64:X=USR(VARPTR(S0))ELSEIFP2=606THEN0 2=-64:X=USR(VARPTR(S0))
- 1160 P2=P2+02:Q2=PEEK(15360+P2):PRINT@P
- 1170 IFB(3)=OTHEN1200
- 1180 PRINT@P3,CHR\$(Q3);:IFP3=429THEN03= 64:X=USR(VARPTR(S0))ELSEIFP3=621THEN0 3=-64:X=USR(VARPTR(S0))
- 1190 P3=P3+03:Q3=PEEK(15360+P3):PRINT@P 3,"*";
- 1200 IFB(4)=OTHEN1230
- 1210 PRINT@P4,CHR\$(Q4);:IFP4=207THEN04= 64:X=USR(VARPTR(S0))ELSEIFP4=783THEN0 4=-64:X=USR(VARPTR(S0))
- 1220 P4=P4+04:Q4=PEEK(15360+P4):PRINT@P
 4,"*";
- 1230 IFB(5)=OTHEN1260
- 1240 PRINT@P5,CHR\$(Q5);:IFP5=223THEN05= 64:X=USR(VARPTR(S0))ELSEIFP5=799THEN0 5=-64:X=USR(VARPTR(S0))
- 1250 P5=P5+05:Q5=PEEK(15360+P5):PRINT@P 5,"*";
- 1260 IFB(6)=OTHEN1290
- 1270 PRINT@P6,CHR\$(Q6);:IFP6=240THEN06= 64:X=USR(VARPTR(S0))ELSEIFP6=816THEN0 6=-64:X=USR(VARPTR(S0))
- 1280 P6=P6+06:Q6=PEEK(15360+P6):PRINT@P 6,"*";
- 1290 IFB(7)=OTHEN1320
- 1300 PRINT@P7,CHR\$(Q7);:IFP7=77THEN07=6 4:X=USR(VARPTR(S0))ELSEIFP7=909THEN07 =-64:X=USR(VARPTR(S0))

- 1310 P7=P7+07:Q7=PEEK(15360+P7):PRINT@P 7,"*";
- 1320 IFB(8)=OTHEN1350
- 1330 PRINT@P8,CHR\$(Q8);:IFP8=96THEN08=6 4:X=USR(VARPTR(SO))ELSEIFP8=928THEN08 =-64:X=USR(VARPTR(SO))
- 1340 P8=P8+08:Q8=PEEK(15360+P8):PRINT@P 8,"*";
- 1350 IFB(9)=OTHEN1390
- 1360 PRINT@P9,CHR\$(Q9);:IFP9=114THEN09= 64:X=USR(VARPTR(S0))ELSEIFP9=946THEN0 9=-64:X=USR(VARPTR(S0))
- 1370 P9=P9+09:Q9=PEEK(15360+P9):PRINT@P
- 1380 REM * SCAN KEYBOARD FOR PRESSED KE Y *
- 1390 IFPEEK(14352)=128THEN1620
- 1400 IFPEEK(14368)=1THEN1660
- 1410 IFPEEK(14368)=2THEN1700
- 1420 IFPEEK(14352)=160RPEEK(14342)=32TH EN1740
- 1430 IFPEEK(14352)=320RPEEK(14338)=2THE N1780
- 1440 IFPEEK(14352)=640RPEEK(14338)=128T HEN1820
- 1450 IFPEEK(14352)=20RPEEK(14338)=4THEN 1860
- 1460 IFPEEK(14352)=40RPEEK(14338)=8THEN 1900
- 1470 IFPEEK(14352)=80RPEEK(14338)=16THE N1940
- 1480 IFA5=OTHEN1590
- 1490 A5=0:GOSUB2010
- 1500 IFQ1=191THENQ1=128
- 1510 IFQ2=191THENQ2=128
- 1520 IFQ3=191THENQ3=128
- 1530 IFQ4=191THENQ4=128
- 1540 IFQ5=191THENQ5=128
- 1550 IFQ6=191THENQ6=128
- 1560 IFQ7=191THENQ7=128
- 1570 IFQ8=191THENQ8=128
- 1580 IFQ9=191THENQ9=128
- 1590 C1=C1-_5:A2=FIX(C1):IFA2=OANDA4=OT HEN2O9OELSEIFA2=-1THENA2=59:C1=59.5:A 4=A4-1
- 1600 GOT01100
- 1610 REM * ROUTINES FOR CATCHING SUN *
- 1620 IFA5<>1THENX=USR(VARPTR(S1)):GOSUB 2010
- 1630 A5=1:PRINT@586,H(1,1);:PRINT@648,H (1,2);
- 1640 IFP1=594THENX=USR(VARPTR(S)):A1=A1 +1:PRINT@P1,CHR\$(Q1);:B(1)=0:P1=402:Q 1=128:GOSUB2050
- 1650 GOT01590

THE PROGRAMMER'S GUILD MEANS ADVENTURE

THUNDER ROAD ADVENTURE

It is late in the evening. The moon has just risen over the top of the mountain. Grandpa McKee has just loaded the last jug of White Lightning into the car. Everything is ready. Then as if on cue, the RIDGERUNNER appears. He is cool, confident, as he slides behind the wheel of the fuel injected '57 Chevy. He cranks the engine and it leaps into life with a throaty roar, 427 cubic inches of raw horsepower. Grandpa McKee hands him the destination slip. It says, simply KNAWBONE. A thin smile comes over the RIDGERUNNER'S face. KNAWBONE is Sheriff Bubba Clemmons' territory. There would be a lot of action tonight. He flips the Hurst shifter into low gear and powers away in a hail of dust and a shower of stones. Grandpa McKee shakes his head. The boy will be in for a rough time tonight, of all the routes in these hills this one is the toughest. That's why they call it --- THUNDER ROAD!

THUNDER ROAD ADVENTURE is so real you almost expect to see Burt Reynolds cruise by in a black Firebird. The RIDGERUNNER is your eyes and ears as you manuver the country roads around Hazzard county. There are Revenoors, hungry bears, a good looking lady hitchiker, treacherous roads, burned out bridges, roadblocks and puzzles to solve before you can deliver your cargo of pure Kentucky Corn to the thirsty old Boys in KNAWBONE. Can you dodge the long arm of the law, and all the pitfalls of Hazzard County? Or will you wind up in Sheriff Bubba's pokey? THUNDER ROAD ADVENTURE is classic adventure style for ADVENTURE fans of all ages.

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Circle 30

SEND CHECK OR M/O (SHIPMENT WITHIN FIVE DAYS OF RECEIPT) C.O.D. ACCEPTED

- 1660 IFA5<>2THENX=USR(VARPTR(S2)):GOSUB 2010
- 1670 A5=2:PRINT@601,H(2,1);:PRINT@664,H (2,2);
- 1680 IFP2=606THENX=USR(VARPTR(S)):A1=A1 +1:PRINT@P2,CHR\$(Q2);:B(2)=0:P2=414:Q 2=128:GOSUB2050
- 1690 GOT01590
- 1700 IFA5<>3THENX=USR(VARPTR(S3)):GOSUB 2010
- 1710 A5=3:PRINT@614,H(3,1);:PRINT@679,H
 (3,2);
- 1720 IFP3=621THENX=USR(VARPTR(S)):A1=A1 +1:PRINT@P3,CHR\$(Q3);:B(3)=0:P3=429:Q 3=128:GOSUB2050
- 1730 GOT01590
- 1740 IFA5<>4THENX=USR(VARPTR(S4)):GOSUB 2010
- 1750 A5=4:PRINT@711,H(4,1);:PRINT@773,H
 (4,2);
- 1760 IFP4=783THENX=USR(VARPTR(S)):A1=A1 +1:PRINT@P4,CHR\$(Q4);:B(4)=0:P4=207:Q 4=128:GOSUB2050
- 1770 GOT01590
- 1780 IFA5<>5THENX=USR(VARPTR(S5)):GOSUB 2010
- 1790 A5=5:PRINT@728,H(5,1);:PRINT@791,H (5,2);
- 1800 IFP5=799THENX=USR(VARPTR(S)):A1=A1 +1:PRINT@P5,CHR\$(Q5);:B(5)=0:P5=223:Q 5=128:GOSUB2050
- 1810 GOT01590
- 1820 IFA5<>6THENX=USR(VARPTR(S6)):GOSUB 2010
- 1830 A5=6:PRINT@743,H(6,1);:PRINT@808,H (6,2);
- 1840 IFP6=816THENX=USR(VARPTR(S)):A1=A1 +1:PRINT@P6,CHR\$(Q6);:B(6)=0:P6=240:Q 6=128:GOSUB2050
- 1850 GOT01590
- 1860 IFA5<>7THENX=USR(VARPTR(S7)):GOSUB 2010
- 1870 A5=7:PRINTa836,H(7,1);:PRINTa898,H (7,2);:PRINTa961,H(7,3);
- 1880 IFP7=909THENX=USR(VARPTR(S)):A1=A1 +1:PRINT@P7,CHR\$(Q7);:B(7)=0:P7=77:Q7 =128:GOSUB2050
- 1890 GOT01590
- 1900 IFA5<>8THENX=USR(VARPTR(S8)):GOSUB 2010
- 1910 A5=8:PRINT@855,H(8,1);:PRINT@918,H (8,2);:PRINT@982,H(8,3);
- 1920 IFP8=928THENX=USR(VARPTR(S)):A1=A1 +1:PRINT@P8,CHR\$(Q8);:B(8)=0:P8=96:Q8 =128:GOSUB2050
- 1930 GOT01590

- 1940 IFA5<>9THENX=USR(VARPTR(S9)):GOSUB 2010
- 1950 A5=9:PRINT@872,H(9,1);:PRINT@937,H(9,2);:PRINT@1001,H(9,3);
- 1960 IFP9=946THENX=USR(VARPTR(S)):A1=A1 +1:PRINT@P9,CHR\$(Q9);:B(9)=0:P9=114:Q 9=128:GOSUB2050
- 1970 GOT01590
- 1980 REM * PRINT UPPER GRID *
- 1990 PRINTa1,U1;:PRINTa66,U2;:PRINTa132,U3;:PRINTa197,U4;:PRINTa263,U5;:PRINTa328,U6;:PRINTa394,U7;:PRINTa459,U8;
- 2000 REM * PRINT LOWER GRID *
- 2010 PRINTa523,D1;:PRINTa586,D2;:PRINTa 648,D3;:PRINTa711,D4;:PRINTa773,D5;:P RINTa836,D6;:PRINTa898,D7;:PRINTa961, D8;:RETURN
- 2020 REM * SELECT SUN LOCATION *
- 2030 FORN1=1T09:B(N1)=0:NEXTN1
- 2040 FORN1=1TOA3:B(RND(9))=1:NEXTN1
- 2050 N2=0:FORN1=1T09:N2=N2+B(N1):NEXTN1
- 2060 IFN2<>A3THENB(RND(9))=1:G0T02050
- 2070 RETURN
- 2080 REM * PRINT SCORE, RATING, AND COM MENTS *
- 2090 CLS:PRINT@26,"* SUNDANCE *";
- 2100 PRINTa128,"YOU SCORED";A1;"WITH";A 3;"SUNS RUNNING AT THE SAME TIME.";
- 2110 PRINT@192,"ON A SCALE OF 0 TO 100 THAT RATES:";STR\$(INT((A1*100)/(A3*40)));".";
- 2120 ONINT(((A1*100)/(A3*40))/10)GOT021 40,2150,2160,2170,2180,2190,2200,2210 ,2220,2230
- 2130 G="BURRRP!":GOT02240
- 2140 G="NOT TOPS.":GOTO2240
- 2150 G="I'VE SEEN BETTER.":GOTO2240
- 2160 G="MINOR LEAGUE.":GOT02240
- 2170 G="ACCEPTABLE.":GOTO2240
- 2180 G="MEDIOCRE.":GOTO2240
- 2190 G="RESPECTABLE.":GOT02240
- 2200 G="OK FOR A HUMAN.":GOT02240
- 2210 G="WORTHY OPPONENT.":GOT02240
- 2220 G="GIVE THAT MAN A CIGAR!":GOTO224
- 2230 G="NO COMMENT."
- 2240 PRINT@256,G;
- 2250 REM * PLAY AGAIN? *
- 2260 PRINT@320,"WOULD YOU LIKE TO PLAY SUNDANCE AGAIN?";
- 2270 I=INKEY\$:IFI=""THEN2270ELSEIFI="Y"
 THENPRINT@384,"OK FINE.";:RUNELSEIFI=
 "N"THENPRINT@384,"PARTY POOPER.";:END
 ELSE2270

Listing 2

TRS-80 32K Disk Basic Model I/III Replacement program lines for the 16K Tape version

30 REM * DON'T FORGET TO SET MEMORY SIZ E AT 45000! *

760 RESTORE: FORN1=-20535T0-20469: READN2 :POKEN1,N2:NEXTN1

770 IFPEEK(16396)=201THENPOKE16526,0:P0 KE16527,191ELSEDEFUSR=-20535:CMD"T"

Listing 3 TRS-80 16K Extended Basic Color Computer

10 REM * SUNDANCE *

20 REM * VERSION 4.1 COLOR

30 REM * COPYRIGHT 1980

40 REM * JON A. WAPLES

50 GOT0140

60 IF P(I) <= U(I) THEN F(I) = D ELS

E IF P(I) >= L(I) THEN F(I) =-D

70 LINE(X(I),P(I))-(X(I)+6,P(I)+

10) PSET_BF

80 IF F(I)<0 THEN120

90 LINE(X(I),P(I))-(X(I)+6,P(I)+

4) PRESET BF

100 P(I)=P(I)+F(I)

110 RETURN

120 LINE($X(I)_P(I)+10$)-($X(I)+6_P$

(I)+6),PRESET,BF

130 GOTO100

140 CLEAR

150 PCLEAR4

160 AA\$="03;T9;D;P255;D;P255;D;T

3;L2;G;04;D"

170 BB\$="T9;L4;C;03;B;A;T3;L2;04

;G;L4;D;"

180 CC\$="03;P4;L8.;D;L16;P166;D;

L2;G;04;D"

190 DD\$="T9;L4;C;O3;B;O4;C;T3;L2

;03;A;"

200 E\$="XAA\$; XBB\$; XBB\$; XDD\$; XCC\$

;XBB\$;XBB\$;XDD\$;"

210 CLS3

220 PCLS3:PMODE3,1:SCREEN1,0:COL

OR2,3

230 FORA=0 TO .96 STEP .01

240 CIRCLE(128,96),50,2,A

250 NEXTA

260 A4=2:C1=30.5:SC=0

270 D=5

280 FORI=1T03:P(I)=64:U(I)=64:L(

I)=116:NEXTI

290 FORI=4T06:P(I)=38:U(I)=P(I):

L(I)=143:NEXTI

80-U.S. Journal Jul/Aug 1981

Color Computer News

Color Computer News is the first and only magazine devoted to the users ot Radio Shack's Color Computer. Color Computer News allows CC users to have a source of information about their machine plus forums for the exchange of Ideas, discoveries, hetps, and complaints. CCN is published every other month and contains teatures like 6809 Assembler programming, Novice Basic, Advanced Basic, Letters and Technical Forums. CCN reviews current products for the Color Computer and tells the truth about them. good

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Circle 8

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Circle 60

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 X/Y Cursor Control
 Con Echo characters
 Con Echo characters

Sends Special Characters not on the TRS-80 keyboard

Control-G causes "Beep" sound and Graphic Bell to flash on the screen. Accepts all standard VIDEOTEX" control codes.

- Can configure the UART for baud rates from 50-19,200 baud.
- Can send text Slowly for computers that work at "typist" speed.
 Keeps continuous count of Parity, Framing, and Overrun errors.
 Saves a special file with proper settings for each different use includes; 75 page manual Text Editor, Hex Conversion Utilities.

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300 FORL=TTO9;P(1)=12:U(1)=P(1): L(1)=148.NEXTI 310 X(7)=53:X(8)=122:X(9)=195: X(4)=56:X(5)=122:X(3)=185 X(4)=56:X(2)=122:X(3)=185 320 SCS="\$6;BMO_0;DIDIFIR3F1D2G1 ZHIBUSUSTRISTIBOSUBS-\$120;DIDIFIR3F1BOSTIR SETUTBUSUSTRIANTS-\$180;DIDIFIR3F1BOSTIR SETUTBUSUSTRIANTS-\$180;DIDIFIR3F1BOSTIR STORES SERVEN S	· ·	
L(I)=168:NEXTI	300 FORI=7T09:P(I)=12:U(I)=P(I):	\$>"4"THEN500
101 X(7)=551X(8)=122:X(9)=199: X(4)=561X(5)=122:X(6)=190: X(1)=591X(2)=122:X(3)=185 320 SCS="S8;BMO_D,D1D1F1R3F1D2G1 L3M1BUSSTR3F1B06;BM-5,+2;D1D5F1R 3E1U1BU3U1H1L3G1B06BSBM-5,+2;D1D5F1R 3E1U1BU3U1H1L3G1B06BSBM-5,+2;D1D5F1R 3E1U1BU3U1H1L3G1B06BSBM-5,+2;D1D5F1R 3E1U1BU3U1H1L3G1B06BSBM-5,+2;D1D5F1R 3E1U1BU3U1H1L3G1BD6BSBM-5,+2;D1D5F1R 3E1U1BU3U1H1L3G1BM-6,+2;DNSD3DRAU 4RS7*** 3E2U1BU3U1BM-10,F3;BM-6,-7;D7U3E2R1F2 3E2U3D7BM-6,-7;D7U3E2R1F2 3E3U3BM-6,-7;D7U3E2R1F2 3E3U3BM-6,-7;D7U3E2R1F2 3E3U3BM-7,-7;D7U3E2R1F2 3E3U3BM-7,-7;D7U3E2R	L(I)=168:NEXTI	× •
X(1)=56:X(5)=122:X(6)=190: X(1)=59:X(2)=122:X(3)=185 320 SCS="88;BMO,0;D1D1F1R3F1D2G1 L3HBUSETR3F1B06;BM-5,+2;D1D5F1R 320 SCS="88;BMO,0;D1D1F1R3F1D2G1 L3HBUSETR3F1B06;BM-5,+2;D1D5F1R 550 CIRCLE(16,130),12,4;PAINT(16 551UBD3U7H1L3G1B06B8FBM-5,+2;D1 D5F1R3ETUSH1L3G1B06B8FBM-5,+2;D1 D5F1R3ETUSH1L3G1B06B8FBM-5,+2;D1 D5F1R3ETUSH1L3G1B06B8FBM-5,+2;D1 D5F1R3ETUSH1L3G1B06B8FBM-5,+2;D1 D5F1R3ETUSH1L3G1B06B8FBM-5,+2;D1 D5F1R3ETUSH1L3G1B06B8FBM-5,+2;D1 D5F1R3ETUSH1L3G1B06BRDATCA-C,PRD2R2L AR2D7L2R4BD2ND7L2N04L2D7BD2NR5D3 NR3D4F3" S30 TIS="88;BM247,0;R4L2D7BD2NR5D3 NR3D4F3" S40 DRAW"S15C2;BH40,160;BD1DF1R3 F1D2G1L3H1BU5E1R3F1;83;B06BH4-6,- D5F1R2TE2U5D7BH4-6,-7;D7U5E2R1P2 D5F1R2TE2U5D7BH4-7,-175,-175,-175,-175,-175,-175,-175,-1		
X(1)=99:X(2)=122:X(3)=185 320 SCS="88;BMO,0;010TFTR3F10201 L3H18U5E1R3F18b6;BM-5,+2;0105F1R 3E1UHBU3UHHL3G18D68R5BM-5,+2;010 7R4F10161NL4F103BM-6,+2;NR5D3NR4 D4R5" 330 T1S="88;BM27,0;R4L2D7BD2R2L 4R2D7L2R4BD2ND7L2ND4L2D7BD2NR5D3 330 T1S="88;BM247,0;R4L2D7BD2R3L 4R2D7L2R4BD2ND7L2ND4L2D7BD2NR5D3 340 DRAW"S15C2;BM40,160;B01DF1R3 340 DRAW"S15C2;BM40,160;B01DF1R3 570 E1ASE 2U507BM+6,-7;D7U5E2R1F2 570 DRAW"S8;BM+8,-7;G2D3F2R2E2D2 U1ADBH1L2;BH+10,2;E2R1F2D5R1LU3 U1ADBH1L2;BH+10,2;E2R1F2D5R1LU3 H12G2F2RZE1" 360 DRAW"S8;BM+6,1;U7D2E2R1F2D5; 360 GRAW"S8;BM+6,1;U7D2E2R1F2D5; 360 DRAW"S8;BM+6,1;U7D2E2R1F2D5; 360 GRAW"S8;BM+6,1;U7D2E2R1F2D5; 360 GRAW"S8;BM+6,1;U7D2E2R1F2D5; 360 DRAW"S8;BM+0,1;U7D2E2R1F2D5; 360 GRAW"S8;BM+0,1;U7D2E2R1F2D5; 360 GRAW"S8;BM+0,1;U7D2		
220 SCS="88,BMO_0,01011F1R3F10261 3281U1BUSU1H1L3G1BD6BR5BM-5,+2;D1D5F1R 3291U1BUSU1H1L3G1BD6BR5BM-5,+2;D1 3291U1BUSU1H1L3G1BD6BR5BM-5,-2;D1BD1BT1R3 3291U1BUSU1H1BUSE1R3F1;BS;BD6BM-6,-300 G0SUB7B0 3291U1BUSU1BUSE1R3F1;BS;BD6BM-6,-300 G0SUB7B0 3291U1BUSU1BUSE1R3F1;BS;BD6BM-6,-300 G0SUB7B0 3291U1BUSU1BUSE1R3F1;BS;BD6BM-6,-300 G0SUB7B0 3291U1BUSU1BUSE1R3F1;BS;BD6BM-6,-300 G0SUB7B0 3291U1BUSU1BUSE1R3F1;BS;BD6BM-6,-300 G0SUB7B0 3291U1BUSU1BUSE1R3F1;BS;BD6BM-6,-300 G0SUB7B0 3291UBUSU1BUSE1R3F1;BS;BD6BM-6,-300 G0SUB7B0 3291UBUSU1BUSE1R3F1;BS;BD6BM-6,-300 G0SUB7B0 3291UBUSU1BUSE1R3F1;BS;BD6BM-6,-300 G0SUB7B0 3291UBUSU1BUSE1R3F1;BS;BD6BM-6,-300 G0SUB7B0 3291UBUSU1BUSE1R3F1;BS;BD6BM-6,-300 G0SUB7B0 3291UBUSU1BUSE1R4E,-300 G0SUB7B0 3291UBUSU1BUSE1R4BUSE1R4B0B0 3291UB		
Same		
SETUTBUSJITHILSG1BD6BR5Bm-5, +2; pl D5F1RSETUSHIL3G1BD6BR5Bm-5, +2; pl D7R4F1D1G1NL4F1D3Bm-6, +2; nk5D3NR4 D4R5"		
DSF1RSETUSH1L3G1BbGGRSBm-5,+2;NB TR4FID1G1NL4F1D3BM-6,+2;NR5D3NR4 D4K5" 330 T1\$="\$8;BM247,0;R4L2D7BDZR2L 330 T1\$="\$8;BM247,0;R4L2D7BDZRZL 330 T1\$="\$8;BM247,0;R4L2D7BDZRZL 330 T1\$="\$8;BM247,0;R4L2D7BDZRZL 340 DRAW"S15C2;BM40,160;BD1DF1R3 F1D2G1L3H1BUSETR3F1;83;BbGBM+6,- 2;D5F2R1E2U5D7BM+6,-7;D7U5EZR1F2 550 BRAW"S8;BM+6,-7;D7U5EZR1F2 550 BRAW"S8;BM+6,-7;D7U5EZR1F2 550 BRAW"S8;BM+6,-7;D7U5EZR1F2 550 BRAW"S8;BM+6,-7;D7U5EZR1F2 560 DRAW"S8;BM+6,-7;D7U5EZR1F2D5; 560 GOSUB 910 571 582 DRAW"S8;BM+6,-7;D7U5EZR1F2D5; 560 GOSUB 910 680 C1=C1-1:AZ=INT(C1):IFAZ=OTH 680 C1=C1-1:A		
7R4F1D1G1NL4F1D3BM-6,+2;NR5D3NR4 4R5PT12R4BD2ND7L2RD4L2D7BD2R2L 4R2D7L2R4BD2ND7L2RD4L2D7BD2RSD3 500 DRAW"S15C2;BHAQ,160;BD1DF1R3 340 DRAW"S15C2;BHAQ,160;BD1DF1R3 350 DRAW"S15C2;BHAQ,160;BD1DF1R3 350 DRAW"S15C2;BHAQ,160;BD1DF1R3 350 DRAW"S15C2;BHAQ,160;BD1DF1R3 350 DRAW"S15C2;BHAQ,160;BD1DF1R3 350 DRAW"S1BUSERRSF1;88;BD6BM+6,- 2;D5F2R1E2U5D7BM+6,-7;D7U5E2R1F2 350 DRAW"S8;BH+8,-7;G2D3F2R2E2D2 U1ADBH1L2;BM+10,2;E2R1F2D5R1L1U3 H1L2G2F2R2E1" 350 DRAW"S8;BM+6,1;U7D2E2R1F2D5; BM+1U,-5;H2L1G2D3F2R1E2;BM+5,-2; FMC1U,-5;H2L1G2D3F2R1E2;BM+5,-2; FMC1U,		
D485"		
330 T15="83;BM247,0;R4L207BD2R2L	· · · · · · · · · · · · · · · · · · ·	
AR2D7L2R4BD2ND7L2ND4L2D7BD2NR5D3 NR3D4R5" NR3D4R5" 600 A\$=INKEY\$: IF A\$="" THEN 63 00 A\$=INKEY\$: IF A\$="" THEN 63 00 A\$=INKEY\$: IF A\$="" THEN 63 01 V=VAL(A\$): IF V=0 THEN 630 02:D5F2R1E2U5D7BM+6,-7;D7U5E2R1F2 05" 630 C1=C11:A2=INT(C1):IFA2=OTH EN1180 640 LINE(247,88)-(247,88+(61-(2*C1)), PRESET 650 G0T0540 660 REM ** DRAW GRID ** 670 PLAY		
NR304RS" 340 DRAW"S15C2;BM40,160;BD1DF1R3 F1D2G1L3H1BU5E1R3F1;S8;BD6BM+6,- 2;D5F2R1E2U5D7BM+6,-7;D7U5E2R1F2 505" 350 DRAW"S8;BM+8,-7;G2D3F2R2E2D2 U140BH1L2;BM+10,2;E2R1F2D5R1L1U3 H1L2G2F2R2E1" 360 DRAW"S8;BM+6,1;U7D2E2R1F2D5; BM+10,-5;H2L1G2D3F2R2E2" 370 PLAY E\$ 380 SCREENO,1 390 PRINT32O," A JON WAPLES PRODUCTION" 400 PRINT" COPYRIGHT 198 0" 410 PRINT" COPYRIGHT 198 0" 410 PRINT" DO YOU WANT INSTRUC TIONS?" 420 A\$=INKEY\$: IFA\$=""THEN400 440 IFA\$="N"THEN400 440 IFA\$="N"THEN400 450 GOTO-500 450 GOTO-500 450 LINE(42,82)-(12,4);PSET 750 LINE(243,47)-(213,109);PSET 750 LINE(243,47)-(213,109);PSET 750 LINE(243,47)-(12,4);PSET 750 LINE(243,47)-(12,47);PSET 750 LINE(243,4	/DDD71 20/RD2ND71 2ND/1 2D7RD2ND5D3	
340 DRAW"S15C2;BMA0,160;BD1DF1R3 F1D2G1L3H1BU5ETR3F1;S8;BD6BM+6,- 2;D5F2R1EZU5D7BM+6,-7;D7U5EZR1F2 550 DRAW"S8;BM+8,-7;G2D3FZR2E2D2 U14D8H1L2;BM+10,2;EZR1FZD5R1L1U3 H1L2G2FZRZET! 360 DRAW"S8;BM+6,1;U7D2EZR1F2D5; BM+10,-5;H2L1G2D3FZRIEZ;BM+5,-2; R5U1H2L2G2D3FZRZEZ" 370 PLAY E\$ 380 SCREENO,1 370 PRINT" COPYRIGHT 198 O'' 400 PRINT" COPYRIGHT 198 O'' 410 PRINT" DO YOU WANT INSTRUC TIONS?" 420 A\$=INKEYS:IFA\$=""THEN420 440 IFA\$="N"THEN440 440 IFA\$="N"THEN440 440 IFA\$="N"THEN440 450 GOTO420 460 CLS:PRINT"SUNDANCE IS A EASY GAME. I T CONSISTS OF 2 T O4 SUNS WHICH BOUNCE BETWE EN 2 3X3 GRIDS VIEWED IN PE RSPECTIVE." AND PRINT"THE OBJECTIVE OF THE G AME IS TO CATCH AS MANY SU NS AS POSSIBLE. TO DO THI S YOU MUST OPEN ONE OUT OF" N THE FURTHEST THREE GR NS AS POSSIBLE. TO DO THI S YOU MUST OPEN ONE OUT OF" N THE FURTHEST THREE GR NS AS POSSIBLE. TO BO THE MIDS R OF SUNS (2-4)"; FOR THE CLOSEST THREE. NO THRE EXTRACT. HERE GR HDS; A, 5, OR 6 FOR THE MID DLE THREE; AND 7, 8, OR 9 FOR THE CLOSEST THREE. NO		
F1D2G1L3H1BUSETR3F1;88;BD6BM-6,— 2;D5F2R1E2U5D7BM+6,—7;D7U5E2R1F2 50 DRAW"S8;BM+8,—7;G2D3F2R2E2D2 U14D8H1L2;BM+10,2;E2R1F2D5R1L1U3 H1L2G2F2R2ET" 360 DRAW"S8;BM+6,1;U7D2E2R1F2D5; BM+10,—5;PL21G2D3F2R1E2;BM+5,—2; R5U1H2L2G2D3F2R2E2" 370 PLAY E\$ 380 SCREEN0,1 390 PRINTT320," A JON WAPLES PRODUCTION" 400 PRINT" COPYRIGHT 198 0" 410 PRINT" COPYRIGHT 198 0" 420 A\$=INKEY\$:IFA\$=""THEN460 440 IFA\$="N"THEN460 440 IFA\$="N"THEN460 440 IFA\$="N"THEN460 450 GUTO420 450 GUTO420 460 CLS:PRINT"SUNDANCE IS A EASY GAME. II CONSISTS OF 2 T OA SUNS WHICH BOUNCE BETWE EN 2 3X3 GRIDS VIEWED IN PE RSPECTIVE." 470 PRINT"HE OBJECTIVE OF THE G AME IS TO CATCH AS MANY SU NS AS POSSIBLE. TO DO THI S YOU MUST OPEN ONE OUT OF" 180 FINT"NINE LOWER GRIDS. USE THE KEYS 1, 2, OR 3 TO OPE N THE FURTHERS THREE GR IDS; 4, 5, OR 6 FOR THE MID DLE THREE; AND 7, 8 OR 9 FOR THE CLOSEST THREE. 490 PRINTPRINTINE LOWER GRIDS. USE THREE; AND 7, 8 OR 9 FOR THE CLOSEST THREE. 490 PRINTPRINTE ENTER THE NUMBE R OF SUNS (2-4)"; 500 CASH 10 CON SUB THE V3-30 CREATER OF THE MID BLE THREE GR 1DS; 4, 5, OR 6 FOR THE MID BLE THREE GR 1DS; 4, 5, OR 6 FOR THE MID BLE THREE GR 1DS; 4, 5, OR 6 FOR THE MID BLE THREE GR 1DS; 4, 5, OR 6 FOR THE MID BLE THREE; AND 7, 8 OR 9 FOR THE CLOSEST THREE. 490 PRINTPRINTER ENTER THE NUMBE R OF SUNS (2-4)"; 500 CASH 10 CON SUB THE CLOSEST THREE GR 1DS; 4, 5, OR 6 FOR THE MID BLE THREE GR 1DS; 4, 5, OR 6 FOR THE MID BLE THREE GR 1DS; 4, 5, OR 6 FOR THE MID BLE THREE GR 1DS; 4, 5, OR 6 FOR THE MID BLE THREE GR 1DS; 4, 5, OR 6 FOR THE MID BLE THREE GR 1DS; 4, 5, OR 6 FOR THE MID BLE THREE GR 1DS; 4, 5, OR 6 FOR THE MID BLE THREE GR 1DS; 4, 5, OR 6 FOR THE MID BLE THREE GR 1DS; 4, 5, OR 6 FOR THE MID BLE THREE GR 1DS; 4, 5, OR 6 FOR THE MID BLE THREE GR 1DS; 4, 5, OR 6 FOR THE MID BLE THREE GR 1DS; 4, 5, OR 6 FOR THE MID BLE THREE GR 1DS; 4, 5, OR 6 FOR THE MID BLE THREE GR 1DS; 4, 5, OR 6 FOR THE MID BLE THREE GR 1DS; 4, 5, OR 6 FOR THE MID BLE THREE GR 1DS; 4, 5, OR 6 FOR THE MID BLE THREE GR 1DS BLE THE BLOW BLE THE BLE THE MID BLE TH		
2;D\$F2R1E2U5D7BM+6,-7;D7U5E2R1F2 D5" 630 C1=C11:A2=INT(C1):IFA2=OTH 640 LINE(247,88)-(247,88+(61-(2* C1))) PRESET 650 GOTO560 660 REM ** DRAW GRID ** 670 PRINT**INENDAM GRID ** 670		-
D5" 350 DRAW"S8;BM+8,-7;G2D3F2R2E2D2 U14D8H1L2;BM+10,2;E2R1F2D5R1L1U3 H1L2G2F2R2E1" 360 DRAW"S8;BM+6,1;U7D2E2R1F2D5; BM+10,-5;P2L1G2D3F2R1E2;BM+5,-2; R5U1H2L2G2D3F2R1E2;BM+5,-2; R5U1H2L2G2D3F2R1E2;BM+5,-2; R5U1H2L2G2D3F2R2E2" 370 PLAY E\$ 380 SCREENO,1 390 PRINT32O," A JON WAPLES PRODUCTION" 400 PRINT" COPYRIGHT 198 0" 410 PRINT" COPYRIGHT 198 0" 410 PRINT" D0 YOU WANT INSTRUC T1ONS?" 420 A\$=INKEY\$:IFA\$=""THEN420 430 IFA\$="Y"THEN460 430 IFA\$="Y"THEN460 440 IFA\$="Y"THEN460 450 GOTO420 460 CLS:PRINT"SUNDANCE IS A EASY GAME. IT CONSISTS OF 2 T O4 SUNS WHICH BOUNCE BETWE EN 2 3X3 GRIDS VIEWED IN PE EN 2 3X4 SPOSSIBLE. TO DO THI S YOU MUST OPEN ONE OUT OF" 480 PRINT"NINE LOWER GRIDS. USE THE EN EYS 1, 2, OR 3 TO OPE NO THE FURTHEST THREE GR 1DS; 4, 5, OR 6 FOR THE MID DLE THREE; AND 7, 8, OR 9 FOR THE CLOSEST THREE. 490 PRINT:PRINT" ENTER THE NUMBE FOR SUNS (2-4)"; 920 IF V/3-BINT(V/3) THEN V2=195		
350 DRAW"S8;BM+8,-7;G2D3F2R2E2D2 U140BH1L2;BM+10,2;E2R1F2D5R1L1U3 H1L2G2F2R2E1" 360 DRAW"S8;BM+6,1;U7D2E2R1F2D5; BM+10,-5;H2L1G2D3F2R1E2;BM+5,-2; R5U1H2L2G2D3F2R1E2;BM+5,-2; R5U1H2L2G2D3F2R2E2" 370 PLAY E\$ 380 SCREENO,1 390 PRINT32O," A JON WAPLES PRODUCTION" 400 PRINT" COPYRIGHT 198 O" 410 PRINT" DO YOU WANT INSTRUC TIONS?" 420 A\$=INKEY\$:IFA\$=""THEN420 430 IFA\$="W"THEN4460 440 IFA\$="W"THEN4460 440 IFA\$="W"THEN4460 450 GOTO420 460 CLS:PRINT"SUNDANCE IS A EASY GAME. IT CONSISTS OF 2 T 04 SUNS WHICH BOUNCE BETWE EN 2 3X3 GRIDS VIEWED IN PE RSPECTIVE." 470 PRINT"HE OBJECTIVE OF THE G AME IS TO CATCH AS MANY SU NS AS POSSIBLE. TO DO THI S YOU MUST OPEN ONE OUT OF" 480 PRINT"NINE LOWER GRIDS. USE THE KEYS 1, 2, OR 3 TO OPE N THE FURTHEST THREE GR IDS; 4, 5, OR 6 FOR THE MID DLE THREE; AND 7, 8, OR 9 FOR THE CLOSEST THREE. 490 PRINT:PRINT" ENTER THE NUMBE R OF SUNS (2-4)"; 920 IF V/3=INT(V/3) THEN V2=195		
U14D8H1L2;BM+10,2;EZR1F2D5R1L1U3 H1L2G2FZRZET" S10 DRAW"S8;BM+6,1;U7D2E2R1F2D5; BM+10,-5;H2L1G2D3FZR1E2;BM+5,-2; R5U1H2L2G2D3FZRZEZ" S70 PLAY E\$ 380 SCREENO,1 370 PLAY E\$ 380 SCREENO,1 390 PRINTB32D0," A JON WAPLES PRODUCTION" PRODUCTION" COPYRIGHT 198 O" T10 LINE(243,197)-(243,187),PSET T10 LINE(243,49)-(12,4),PSET T10NS?" T20 LINE(243,4)-(12,4),PSET T10NS?" T20 LINE(243,4)-(12,4),PSET T10NS?" T30 LINE(243,4)-(12,4),PSET T10NS?" T40 PRINT" D0 YOU WANT INSTRUC T10NS?" T50 LINE(166,40)-(156,82),PSET T40 LINE(89,487)-(99,82),PSET T40 LINE(89,487)-(99,82),PSET T50 LINE(166,40)-(156,62),PSET T70 LINE(123,80)-(232,30),PSET T70 LINE(123,80)-(232,30),PSET T70 LINE(123,80)-(232,30),PSET T70 LINE(123,80)-(232,30),PSET T70 LINE(1243,40)-(12,4),PSET T70 LINE(123,80)-(243,4),PSET T70 LINE(1243,40)-(12,40),PSET T70 LINE(123,80)-(243,4),PSET T70 LINE(1243,187)-(243,187),PSET T70 LINE(1243,187)-(222,187),PSET T80 LINE(123,80)-(232,30),PSET T80 LINE(123,80)-(232,		
### ### ### ### ### ### ### ### ### ##		
360 DRAW"S8;BM+6,1;U7D2E2R1F2D5; BM+10,-5;H2L1G2D3F2R1E2;BM+5,-2; BM+10,-5;H2L1G2D3F2R1E2;BM+5,-2; BM+10,-5;H2L1G2D3F2R1E2;BM+5,-2; BM+10,-5;H2L1G2D3F2R1E2;BM+5,-2; BM+10,-5;H2L1G2D3F2R1E2;BM+5,-2; BM+10,-5;H2L1G2D3F2R1E2;BM+5,-2; BM+10,-5;H2L1G2D3F2R2E2" 370 PLAY E\$ 380 SCREENO,1 380 SCREENO,1 380 SCREENO,1 380 SCREENO,1 380 SCREENO,1 380 PRINT320," A JON WAPLES PRODUCTION" 400 PRINT" COPYRIGHT 198 0" 400 PRINT" COPYRIGHT 198 0" 410 PRINT" DO YOU WANT INSTRUC T10NS?" 420 A\$=INKEY\$:IFA\$=""THEN420 430 IFA\$="Y"THEN460 440 IFA\$="Y"THEN460 450 GOTO420 450 GOTO420 450 GOTO420 450 GOTO420 450 GOTO420 450 GOTO420 450 LINE(32,30)-(232,30),PSET 450 GOTO420 450 GOTO420 450 GOTO420 450 GOTO420 450 GOTO420 450 FIRIT"SUNDANCE IS A EASY GAME. IT CONSISTS OF 2 T 0 4 SUNS WHICH BOUNCE BETWE EN 2 3X3 GRIDS VIEWED IN PE RSPECTIVE." 470 PRINT"THE OBJECTIVE OF THE G AME IS TO CATCH AS MANY SU NS AS POSSIBLE. TO DO THI S YOU MUST OPEN ONE OUT OF" 480 PRINT"NINE LOWER GRIDS. USE THE KEYS 1, 2, OR 3 TO OPE N THE FURTHEST THREE GR IDS; 4, 5, OR 6 FOR THE MID DLE THREE; AND 7, 8, OR 9 FOR THE CLOSEST THREE. 180 SEPECTIVE." 180 APRINT"PRINT" ENTER THE NUMBE R OF SUNS (2-4)"; 180 APRINT(V/3) THEN V2=195		
### DRAW GRID ** ### DRAW GRI		
## A COLOR OF CLS: SCREEN1, 0 ## A COLOR OF CLS: A COLOR OF		
370 PLAY E\$ 380 SCREENO,1 390 PRINT320," A JON WAPLES PRODUCTION" 400 PRINT" COPYRIGHT 198 0" 410 PRINT" DO YOU WANT INSTRUC TIONS?" 420 A\$=INKEY\$:IFA\$=""THEN420 430 IFA\$="N"THEN460 440 IFA\$="N"THEN460 450 GOTO420 460 CLS:PRINT"SUNDANCE IS A EASY GAME. IT CONSISTS OF 2 T O 4 SUNS WHICH BOUNCE BETWE EN 2 3X3 GRIDS VIEWED IN PE RSPECTIVE." 470 PRINT"THE OBJECTIVE OF THE G AME IS TO CATCH AS MANY SU NS AS POSSIBLE. TO DO THI S YOU MUST OPEN ONE OUT OF" 480 PRINT"NINE LOWER GRIDS. USE THE KEYS 1, 2, OR 3 TO OPE N THE FURTHEST THREE GR IDS; 4, 5, OR 6 FOR THE MID DLE THREE; AND 7, 8, OR 9 FOR THE CLOSEST THREE. 490 PRINT:PRINT" ENTER THE NUMBE R OF SUNS (2-4)"; 500 ALINE(42,82)-(12,43,787), PSET 690 LINE(243,187)-(243,187), PSET 700 LINE(243,187)-(213,192), PSET 710 LINE(243,187)-(213,192), PSET 720 LINE(223,10-(243,4), PSET 720 LINE(243,187)-(213,192), PSET 720 LINE(213,82)-(243,4), PSET 720 LINE(223,10-(243,4), PSET 720 LINE(243,187)-(243,187), PSET 720 LINE(23,187)-(243,187), PSET 720 LINE(243,187), PSET 720 LINE(243,187), PSET 720 LINE(243,187), PSET 720 LINE(23,187), PSET 720 LINE(243,187), PSET 720 LINE(23,187), PSET 720 LINE(243,187), PSET 720 LINE(243,187), PSET 720		
380 SCREENO,1 390 PRINT320," A JON WAPLES PRODUCTION" 400 PRINT" 400 PRINT" 400 PRINT" 500 LINE(42,187)-(213,187),PSET 700 LINE(243,187)-(213,109),PSET 710 LINE(243,487)-(213,109),PSET 710 LINE(243,49)-(243,4),PSET 710 LINE(243,40)-(243,4),PSET 710 LINE(213,82)-(243,4),PSET 710 LINE(243,4)-(12,4),PSET 710 LINE(243,4)-(12,4),PSET 710 LINE(243,4)-(12,4),PSET 711 LINE(243,4)-(12,4),PSET 710 LINE(213,82)-(243,4),PSET 711 LINE(243,4)-(12,4),PSET 710 LINE(213,82)-(243,4),PSET 711 LINE(243,4)-(12,4),PSET 710 LINE(213,82)-(243,4),PSET 711 LINE(213,82)-(243,4),PSET 711 LINE(89,4)-(12,4),PSET 711 LINE(89,4)-(12,4),PSET 710 LINE(89,4)-(12,4),PSET 711 LINE(89,4)-(12,4),PSET 711 LINE(89,4)-(12,4),PSET 710 LINE(89,4)-(12,4),PSET 711 LINE(89,4)-(12,4),PSET 711 LINE(89,4)-(12,4),PSET 711 LINE(23,4)-(12,4),PSET 711 LINE(23,4)-(12,4),PSET 711 LINE(243,4)-(12,4),PSET 711 LINE(243,4)-(12,4),PSET 711 LINE(243,4)-(243,4),PSET 710 LINE(243,4)-(243,4)-(243,4) 70 LINE(243,4)-(243,4) 70 LINE(243,4) 70 LINE(243,4		670 PCLS:SCREEN1,0
390 SCREENU,1 390 PRINTa320," A JON WAPLES PRODUCTION" 400 PRINT" COPYRIGHT 198 O" 410 PRINT" DO YOU WANT INSTRUC TIONS?" 420 A\$=INKEY\$:IFA\$=""THEN420 430 IFA\$="Y"THEN460 440 IFA\$="Y"THEN460 450 GOTO420 460 CLS:PRINT"SUNDANCE IS A EASY GAME. IT CONSISTS OF 2 T 690 LINE(243,187)-(213,109), PSET 750 LINE(243,4)-(12,4), PSET 750 LINE(243,4)-(12,4), PSET 750 LINE(89,4)-(99,82), PSET 750 LINE(89,187)-(99,109), PSET 750 LINE(166,187)-(156,109), PSET 750 LINE(22,30)-(232,30), PSET 750 LINE(22,30)-(232,30), PSET 750 LINE(22,30)-(232,30), PSET 750 LINE(22,30)-(232,30), PSET 750 LINE(22,161)-(232,361), PSET 850 LINE(32,135)-(222,135), PSET 850 LINE(32,135)-(222,135), PSET 850 REM *SELECT SUN LOCATION* 850 FOR N1 = 1TO 9 : NEX 1 N 870 FOR N1 = 1TO 9 : NEX 1 N 870 FOR N1 = 1TO 9 : NEX 1 N 870 FOR N1 = 1TO 9 : NEX 1 N 870 FOR N1 = 1TO 9 : NE 870 FOR N1 = 1 TO 9 : NE 870 F	370 PLAY E\$	680 INF(42.82)=(12 4) PSET
700 LINE(12,187)-(243,187), PSET 710 LINE(243,187)-(243,187), PSET 710 LINE(243,187)-(213,109), PSET 710 LINE(243,82)-(243,4), PSET 720 LINE(243,82)-(243,4), PSET 730 LINE(243,4)-(12,4), PSET 730 LINE(243,4)-(12,4), PSET 730 LINE(243,4)-(12,4), PSET 740 LINE(89,4)-(99,82), PSET 750 LINE(166,4)-(156,82), PSET 750 LINE(243,4)-(12,4), PSET 750 LINE(243,187)-(213,109), PSET 750 LINE(243,4)-(12,4), PSET 750 LINE(243,4)-(12,4)		
PRODUCTION" 400 PRINT" COPYRIGHT 198 O" 410 PRINT" DO YOU WANT INSTRUC TIONS?" 420 A\$=INKEY\$:IFA\$=""THEN420 430 IFA\$=""THEN460 440 IFA\$="N"THEN460 440 IFA\$="N"THEN490 450 GOTO420 460 CLS:PRINT"SUNDANCE IS A EASY GAME. IT CONSISTS OF 2 T O 4 SUNS WHICH BOUNCE BETWE EN 2 3X3 GRIDS VIEWED IN PE RSPECTIVE." 470 PRINT"HE OBJECTIVE OF THE G AME IS TO CATCH AS MANY SU NS AS POSSIBLE. TO DO THI S YOU MUST OPEN ONE OUT OF" 480 PRINT"NINE LOWER GRIDS. USE THE KEYS 1, 2, OR 3 TO OPE NO THE CLOSEST THREE GR IDS; 4, 5, OR 6 FOR THE MID DLE THREE; AND 7, 8, OR 9 FOR THE CLOSEST THREE. 490 PRINT:PRINT" ENTER THE NUMBE R OF SUNS (2-4)"; FOR AME SUNS C-40"; PRODUCTION" 710 LINE(22,30)-(212,30), PSET 700 LINE(423,40)-(156,82), PSET 700 LINE(423,40)-(232,30), PSET 700 LINE(32,35)-(232,30), PSET 800 LINE(32,35)-(232,30), PSET 800 LINE(32,56)-(232,56), PSET 810 LINE(32,155)-(232,56), PSET 810 LINE(32,155)-(232,56), PSET 810 LINE(32,155)-(232,56), PSET 810 LINE(42,82)-(212,82), PSET 810 LINE(42,82)-(212,82), PSET 810 LINE(42,109)-(212,109), PSET 810 LINE(42,109)-(212,109), PSET 810 LINE(42,109)-(212,109), PSET 810 LINE(42,109)-(212,109), PSET 810 LINE(42,109)-(232,30), PSET 810 LINE(42,109)-(232,361), PSET 810 LINE(32,35)-(232,361), PSET 810 LINE(32,35)-(232,361), PSET 810 LINE(32,155)-(232,361), PSET 810 LINE(42,109)-(232,361), PSET 810 LINE(42,109), PSET 810 LINE(4	390 PRINT@320," A JON WAPLES	
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440 IFA\$="N"THEN490 450 GOT0420 460 CLS:PRINT"SUNDANCE IS A EASY GAME. IT CONSISTS OF 2 T 0 4 SUNS WHICH BOUNCE BETWE EN 2 3X3 GRIDS VIEWED IN PE RSPECTIVE." 470 PRINT"THE OBJECTIVE OF THE G AME IS TO CATCH AS MANY SU NS AS POSSIBLE. TO DO THI S YOU MUST OPEN ONE OUT OF" 480 PRINT"NINE LOWER GRIDS. USE THE KEYS 1, 2, OR 3 TO OPE N THE FURTHEST THREE GR IDS; 4, 5, OR 6 FOR THE MID DLE THREE; AND 7, 8, OR 9 FOR THE CLOSEST THREE. 490 PRINT"PRINT" ENTER THE NUMBE R OF SUNS (2-4)"; FOO ASSINCE/CAPATICAL ALL OF ALL	430 IFA\$="Y"THEN460	
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470 PRINT"THE OBJECTIVE OF THE G AME		
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DLE THREE; AND 7, 8, OR 9 FOR THE CLOSEST THREE. 490 PRINT: PRINT" ENTER THE NUMBE R OF SUNS (2-4)"; 500 ACTIVICIAN TEACH WORLD ACCURATE THE NUMBE POOR RETURN 900 RETURN 910 IF V/4 THEN V1=110 ELSE IF V >6 THEN V1=162 ELSE V1=136 920 IF V/3=INT(V/3) THEN V2=195		
FOR THE CLOSEST THREE. 490 PRINT: PRINT" ENTER THE NUMBE R OF SUNS (2-4)"; 500 AGE THREE. 910 IF V<4 THEN V1=110 ELSE IF V >6 THEN V1=162 ELSE V1=136 920 IF V/3=INT(V/3) THEN V2=195	•	
490 PRINT: PRINT" ENTER THE NUMBE >6 THEN V1=162 ELSE V1=136 R OF SUNS (2-4)"; 920 IF V/3=INT(V/3) THEN V2=195		
490 PRINT: PRINT" ENTER THE NUMBE >6 THEN V1=162 ELSE V1=136 R OF SUNS (2-4)"; 920 IF V/3=INT(V/3) THEN V2=195		910 IF V<4 THEN V1=110 ELSE IF V
FOO ACTURE VALUE ACTUAL		
500 A&-TUVEV&-TEA&-IIIABA&A/II3IABA		920 IF V/3=INT(V/3) THEN V2=195
	SUU AS=INKEYS: IFAS=""ORAS<"2"ORA	ELSE IF $(V-1)/3=INT((V-1)/3)$ THE

N V2=44 ELSE V2=122 930 PAINT (V2,V1),4,2 940 IF P(V)<L(V) THEN PAINT (V2, V1),3,2 : SOUND 1,1 : RETURN 950 LINE(X(V),P(V))-(X(V)+6,P(V)+10), PRESET, BF 960 PLAY A\$ 970 B(V)=0980 IFV<4THENP(V)=64ELSEIFV>6THE NP(V)=12ELSEP(V)=38990 PAINT(V2,V1),3,2 1000 S1=S1+1 : IF S1>9 THEN S1=0 : S2=S2+1 1010 GOSUB1040 1020 GOSUB 880 1030 RETURN 1040 LINE(10,88)-(40,105), PRESET BF:DRAW"BM10,88;" 1050 SX=S2:GOSUB1060:SX=S1:DRAW" BM25,88;" 1060 ONSX+1GOSUB1080,1090,1100,1 110,1120,1130,1140,1150,1160,117 1070 RETURN 1080 DRAW"BD1D5F1R3E1U5H1L3G1BD6 BR5": RETURN 1090 DRAW"BR4D7": RETURN 1100 DRAW"BD1E1R3F1D2G1L3G1D2R4" :RETURN 1110 DRAW"BD1E1R3F1D1G1NL3F1D2G1 L3H1": RETURN 1120 DRAW"D4R3U4D7U3R2": RETURN 1130 DRAW"NR5D4R4F1D1G1L3H1":RET URN 1140 DRAW"BR5BD2U1H1L3G1D5F1R3E1 U1H1L3G1": RETURN 1150 DRAW"R5D1G1D1G1D1G1D1":RETU 1160 DRAW"BD1E1R3F1D1G1L3G1D2F1R 3E1U2H1L3H1U1": RETURN 1170 DRAW"BD3BR4L3H1U1E1R3F1D1G5 ":RETURN 1180 CLS:PRINT@12, "SUNDANCE"; 1190 PRINTa65, "YOU SCORED"; 1200 sc=s2*10+s1 1210 PRINTSC 1220 PRINT" WITH"A3"SUNS RUNNING ":PRINT" AT THE SAME TIME. 1230 PRINT: PRINT" THAT RATES A: 1240 RT=INT((SC*100)/(A3*40)) 1250 PRINT RT 1260 PRINT 1270 PRINT"PLAY AGAIN?"; 1280 A\$=INKEY\$:IFA\$=""THEN1280 Circle 54

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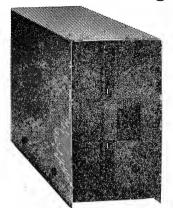
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Aerocomp 80-tk mdl	459 95	yes	?	7	yes	?	yes	yes
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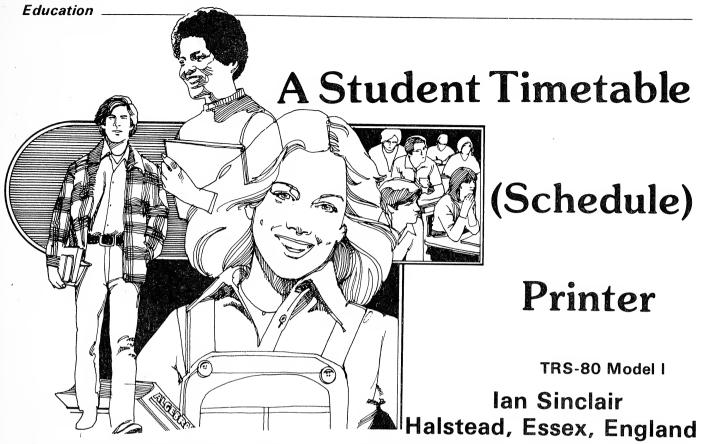
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For me, September comes around a little too quickly each year when my College enrolls its hundreds of students. They appear apparently from nowhere and are anxious to enroll in one of the many courses which we offer.

Like most Colleges in this district of England which operate educational schemes for the age group 16 to 60 (and beyond), we work on a "block" schedule system. The block system arranges subjects in groups, or blocks as illustrated in Figure 1. A student can then select up to five subjects to make up a course, taking one from each block. Provided that no one wants to take two subjects from the same block, the structure of the blocks then insures that any course which is selected in this way can be organized, with rooms and instructors planned in advance.

The block system was a great improvement on previous methods, which alternated between a very restricted choice of a few courses (simple to organize, but little choice for the student) and a 'cafeteria system", in which students could pick almost any combination of subjects (plenty of choice, but difficult to organize, with the chance that a large number of students would have to be told later than the course they have chosen was not available). The only hitch in the block system is that of writing a schedule for each student. In the years before Tandy, this was done the hard way. An admissions officer would consult with each student and prepare a list which showed each subject and its block number. The student would then go see his class

counselor, who would write out an individual schedule on the basis of the subjects, block numbers, and block schedule, which showed when each block of subjects could be taught (see Figure 2).

This year the TRS-80 which has replaced our mainframe computer did the dirty work. Students with a list of their subjects and block numbers lined up and had their schedules printed by the TRS-80. Results were shorter lines, quicker turnover, less frustration and more time for counselors to concentrate on student needs rather than on the mechanical business of writing out a schedule in a hurry.

The key to all this serenity was the program accompanying this article. The program allows a block diagram to be created on the video screen and recorded. so that several different sets can be used. With a given block diagram in use, student schedules can be printed in duplicate when subjects and the corresponding block numbers are fed in. An example of a schedule in this way is shown in Figure 3. The subjects are denoted by four letter abbreviations with space left for room numbers when they are scheduled (I'm working on that one - it's more an organizational problem than a programming problem). The exclamation marks are used as vertical dividers because the only printer which was available on enrollment day (and which could be easily moved) was one which lacked graphics capabilities.

The Program

I never put REM statements into programs. I regard the use of REMs as an

inferior way of documenting a program. My practice is to keep a full record of the aims of the program, its developmental stages, and a line-by-line account of how it operates. This makes more paperwork, but is very much better than a string of REMs for understanding the flow of the program. The description of the program which follows is taken from those records.

The program starts on line 5 with the CLEAR to provide string space, and the definition of integer variables. In my own version, lines 1 through 4 contain READ, POKE and DATA statements which load a machine-code program into high memory so that the serial printer can be driven from the TRS-80 cassette port. I have omitted these lines in this listing, because they are needed only if the hardware demands them. The only arrays which are used are dimensioned in line 7.

Line 8 offers the option for seeing, instructions. The question is answered by typing YES or NO with no need to hit enter. The subroutine in line 1100 uses INKEY\$ to accomplish this. The subroutine for the instructions is found in lines 500 and 510. Following the appearance of the instructions, a flashing asterisk (called the flashterisk) acts as a prompt. Pressing any key, other than BREAK, will allow the program to proceed. The flashterisk routine (in line 1000) is used in several places in this and other of my programs. Where hardcopy is called for, pressing the "P" key when the asterisk flashes will start a printout, while any other key will bypass this step. This allows me to go quickly through a program to try out new ideas without waiting for a printer.

Figure 1 0 Level Blocks

Block 1	Block 2	Block 3	Block 4	Block 5	Block 6
Math	Biology	Math	Pysics	Tech Dwg	Chemistry
Statistics	Physics	English	Geography	Math	Computing
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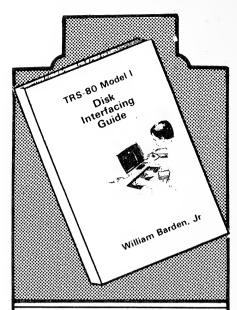
Figure 2 — Sample Block Schedule Lower Cert.

			Periods					
	1	2	3	4	5	6	7	8
MON	3	6	6		5	5	1	4
TUE	6	2	2		2	1	1	9
WED	7	7	4		3	3	8	8
THU	5	5	5		2	2	4	6
FRI	4	4	1		3	3	6	1



Figure 3 — Sample Student Timetable Printout

Benny Hill								GEN-1
	1	2	3	4	5	6	7	В
MON	СНЕМ				MATH	MATH	ENGL	GEOG
TUE		PHYS	PHYS		PHYS	ENGL	ENGL	
WED			GEOG		CHEM	CHEM		
тни	MATH	MATH	MATH		PHYS	PHYS	GEOG	
FRI	GEOG		ENGL					ENGL
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- 5 CLEAR4000:DEFINTI,J,N,P,Q,R,X-Z:DEFST RA-H,K-M,S-W
- 7 DIM B(41),S(30),H(30,9)
- 8 CLS:PRINTTAB(5)"NEED INSTRUCTIONS? AN SWER YES OR NO, DO NOT USE ENTER":GOS UB1100:IFR=1THENGOSUB500
- 9 FOR N =1TO5:READ D(N):NEXT
- 10 CLS:PRINTCHR\$(23)TAB(13)"CHOICE":PRI NTTAB(1)"1.ENTER BLOCK TIMETABLE.":PR INTTAB(1)"2.REPLAY BLOCK TIMETABLE.": PRINTTAB(1)"3.CREATE TIMETABLES.":PRI NTTAB(1)"4.END PROGRAM
- 20 GOSUB1000:N=VAL(K):IFN=4THENCLS:GOTO 6000:ELSEIFN>OANDN<4THENPRINTCHR\$(28) :CLS:PRINT@344,"IS PRINTER READY?":EL SE F="INCORRECT CHOICE":GOSUB1300:GOT 010
- 30 GOSUB1100:IF R=1THENPX=1ELSEPX=0
- 40 ON N GOTO2000,3000,4000,6000
- 50 CLS:PRINT0336,"DO YOU WANT TO RETURN TO THE MENU?":GOSUB1100:IFR=1THEN10E LSE6000
- 60 STOP
- 500 CLS:PRINTTAB(26)"INSTRUCTIONS":PRIN T:PRINT"1. FOR CHOICE, TYPE NUMBER ON LY, DO NOT USE ENTER.":PRINT"2. FLASH ING ASTERISK IS A PROMPT, PRESS ANY K EY TO PROCEED.":PRINT"3. WHERE A PRIN TOUT IS NEEDED, PRESS 'P' WHEN ASTERI SK FLASHES."
- 510 PRINT"4. USE ONLY SINGLE CHARACTERS IN BLOCK ENTRY":PRINT"5. USE FOUR CHARACTERS FOR SUBJECT ABBREVIATION":GO SUB1000:RETURN
- 1000 K=INKEY\$:PRINTTAB(1)"*";:IFK=""THE NFORX=1T060:NEXT:PRINTCHR\$(8);:FORX=1 T060:NEXT:GOT01000:ELSE RETURN:RETURN
- 1100 A=""
- 1110 K=INKEY\$:IFK=""THEN1110ELSEPRINTK; :A=A+K:IFLEN(A)<2THEN1110
- 1120 IFLEN(A)=2ANDA="NO"THENR=2:RETURN: ELSEIFLEN(A)=3AND A="YES"THENR=1:RETURN
- 1130 IFLEN(A)=2THEN1110ELSE F="MISTAKE" :GOSUB1300:PRINT"YES OR NO?":GOTO1100
- 1200 LPRINT"": I=15360: FORNN=0T015: FORPP =0T063: LPRINTCHR\$ (PEEK(I+64*NN+PP));: NEXTPP: LPRINT: NEXTNN: RETURN
- 1300 CLS:PRINT@320,"":PRINTCHR\$(23):FOR X=1T015:PRINTTAB((32-LEN(F))/2)F;:FOR Z=1T030:NEXTZ:PRINTCHR\$(29);CHR\$(30); CHR\$(29);:FORZ=1T030:NEXTZ:NEXTX:CLS: RETURN
- 1400 STOP
- 2000 CLS:INPUT"PLEASE TYPE A HEADING FO R THIS BLOCK";L:CLS:PRINTTAB(25)L;" L EVEL BLOCK":PRINTTAB(25)STRING\$(13,61):PRINTTAB(28)"PERIODS":PRINTTAB(5)"!

- ";:FORP=1TO8:PRINTTAB(7*P)P;" !";:NE XT:PRINT:PRINTSTRING\$(63,45):FORN=1TO
- 2010 PRINTD(N);:INPUT B(8*N-7),B(8*N-6),B(8*N-5),B(8*N-4),B(8*N-3),B(8*N-2),B(8*N-1)
- 2020 PRINTTAB(61);"!":PRINT"O.K.?";:GOS
 UB1100:IFR=2THENPRINTCHR\$(29);CHR\$(27);CHR\$(30);CHR\$(29);CHR\$(27):GOTO2010
 :ELSEPRINTCHR\$(29);CHR\$(30);CHR\$(27):
 PRINTSTRING\$(63,45):NEXTN
- 2030 GOSUB1000:IF K="P"AND PX=1THENGOSU B1200
- 2050 PRINT"DO YOU WANT TO USE THIS BLOC K NOW?":GOSUB1100:IFR=1THEN4000ELSE E ND
- 2100 DATA"MON", "TUE", "WED", "THU", "FRI"
 3000 CLS:PRINTTAB(20) "REPLAY OF BLOCK D
 IAGRAM":PRINT:PRINTTAB(2) "PREPARE THE
 CASSETTE FOR REPLAY. PRESS ANY KEY W
 HEN READY.":PRINT:GOSUB1000
- 3010 INPUT#-1,L,S:FORP=1T040:B(P)=MID\$(S,P,1):NEXT:GOSUB3500:GOSUB1000:IF K= "P" AND PX=1THEN GOSUB 1200
- 3020 PRINT"DO YOU WANT TO PRINT TIMETAB LES NOW ?":GOSUB1100:IF R=2 THEN 10 E LSE 4000
- 3030 STOP
- 3500 CLS:PRINTTAB(25)L;" LEVEL BLOCK":P RINT:PRINTTAB(5)"!";:FOR P=1T08:PRINT TAB(7*P)P" !";:NEXT:PRINT:PRINTSTRIN G\$(63,45):FOR N=1T05
- 3510 PRINT D(N);" !";:FOR J=1T08:PRIN TTAB(7*J+1)B(8*N-8+J);" !";:NEXTJ:P RINT:PRINTSTRING\$(63,45):NEXTN:RETURN
- 3520 STOP
- 4000 CLS:INPUT"TUTOR GROUP";G:INPUT"DAT
 E";C:INPUT"NUMBER OF STUDENTS IN THE
 GROUP";Q:FOR P=1TOQ:FORJ=1TO9:H(P,J)=
 "":NEXTJ,P:FORP=1TOQ:H(P,8)="LACT":H(
 P,9)="CTUT":NEXT:FOR P=1TOQ
- 4010 PRINTP". STUDENT'S NAME(NO COMMAS)
 ":INPUTS(P):PRINT"USE ENTRY OF O,XXXX
 TO TERMINATE"
- 4012 INPUT"BLOCK NUMBER, SUBJECT (4 CHAR ACTERS ONLY)"; I, H(P, I): IFLEN(H(P, I)) < >4THEN F="ILLEGAL ENTRY": GOSUB1300:GO T04012: ELSEIFI=OTHENH(P, I)="": I=0:NEX TP: ELSE4012
- 4015 PRINT "READY TO PRINT ?":GOSUB 100 O:FOR P=1TOQ:Z=0
- 4020 LPRINT"- ":LPRINT" ":LPRINTS(P); TAB 80-U.S. Journal Jul/Aug 1981

(60)G:LPRINT:LPRINTSTRING\$(64,45):LPR
INTTAB(4)"!";:FORJ=1TO8:LPRINTTAB(7*J
)J;" !";:NEXTJ:LPRINT:LPRINTSTRING\$(
64,45)

4030 FORN=1T05:LPRINT D(N);" !";:FORJ=1
T08:IF VAL(B(8*N-8+J))<>OTHENLPRINTTA
B(7*J)H(P,VAL(B(8*N-8+J)));:ELSELPRIN
TTAB(7*J)B(8*N-8+J);

4040 LPRINTTAB(7*J+5)"!";:NEXTJ:LPRINT:
LPRINTTAB(4)"!";:FOR J=1T08:LPRINTTAB
(7*J+5)"!";:NEXT:LPRINT:LPRINTC:LPRINT:L
PRINT:IF Z=OTHENZ=1:GOTO4020:ELSENEXT

4070 PRINT:PRINT"PRESS ANY LETTER FOR N
EXT TIMETABLE, NUMBER TO RETURN TO CH
OICE":GOSUB1000:IF ASC(K)<58 AND ASC(
K)>47 THEN 10 ELSE 4000
6000 END

Line 9 reads the day data from the data line 2100, so that D(1)=Monday, D(2)=Tuesday, and so on.

The menu is presented in line 10. This double sized display is created by using CHR\$(23). The flashterisk prompts for a choice. If any illegal number key or letter key is pressed, line 20 will insure flashing an error message. The number chosen will be returned from the subroutine in the string variable K. If the choice is valid the prompt "PRINTER READY?" will be displayed as a reminder that this is a printer oriented program. If "YES" is answered, the variable flag PX is set, which is used later for printing. However, if "NO" is returned then no printing will take place, even if the "P" key is pressed. The print routines make no use of line printer PEEKs so that any serial or parallel printer can be used.

The string variable K is converted into an integer in line 20 and in line 40 is used to direct the program to the proper section. All sections return to line 50, which offers a return to the menu or an END. The END option is also offered in the menu. While this might look excessive, there is nothing so frustrating as having to go through a program putting dummy data in just to locate an END option!

Lines 500 through 1300 contain utility subroutines. 500-510 contain the instructions. Line 1000 is the flashterisk routine. The string variable K is set equal to the value of an INKEY\$ routine. An asterisk is printed at the TAB(1) position. If there was no key pressed, then a time delay is used to keep the asterisk on the screen. This is followed by a wipeout which uses CHR\$(8) (backspace and delete). If a key has been pressed the subroutine will then return to its calling point with the variable K containing the character pressed. If no key is pressed the routine keeps flashing the asterisk until there is some response.



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Circle 69

Lines 1100-1130 contain a YES/NO subroutine which uses string variable A. It is cleared in line 1100. In line 1110 the string variable K is set equal to the INKEY\$ character pressed. This character is added to string A and, if A consists of only one character, the subroutine loops back to 1110 to get another character. When A consists of two characters, line 1120 will test for A="NO". The integer R is set equal to 2 if true and control returns to the main body of the program. If A="YES" then R is set to 1. Line 1130 loops the subroutine back for another character if only two characters are present other than "NO". If three characters are present, but do not make "YES", then an error message is flashed. I use this routine in most of my programs because it permits a direct YES/NO reply without using ENTER. It could be extended with a little effort, but even in its simplest form it is pleasant and convenient to use.

The routine in line 1200 is the wellestablished one for transferring a screen full of information to the printer and needs no further description here.

At line 1300, any message may be flashed on the screen fifteen times. The message, limited to 32 characters, is stored in the string variable F prior to calling this subroutine, and is centered by use of the TAB expression. CHR\$(29);CHR\$(30) clears the message line after a time delay to create a flashing display.

The main program starts in line 2000. A routine here draws a block schedule on the screen, creates a hardcopy, and records the information. The block heading is called for and printed along with the eight period numbers spaced across the screen. (The program assumes an eight period day.) The FOR N=1 TO 5 at the end of line 2000 is the start of the loop which will print the block information.

The block information is entered through the use of an INPUT statement which calls for the list in order (using commas as delimiters) of the eight single-digit numbers. The space bar acts as a blank input. This form of the INPUT statement insures that the numbers fall correctly into an array which then can be recorded. Single digits are used because only nine blocks are needed with this method. A useful refinement would be a check for single digit entries since they are concatenated for recording. A multiple digit entry would create chaos later. This wasn't included here because there are several opportunities for checking correctness in the data before the recording step.

Line 2010 clears the entry line after the last item has been typed through the use of CHR\$(27);CHR\$(30). The remainder of the line prints the information in correct tabular form.

Line 2020 allows the user to check for accuracy when the "OK?" prompt appears. If "NO" is answered, the line is cleared once again for a new set of entries. If "YES"

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is returned, then the information is underlined. This procedure continues for each day until a complete block schedule has been created for a week.

Letters, such as S for Sports, could be used in places to print fixed information into each schedule. The printing routine will place these letters directly in the schedule.

Line 2030 gives the user an opportunity to obtain a hardcopy of the block diagram for yet another check prior to recording this information in line 2040.

The entries are concatenated into a fortycharacter string S for recording. Line 2050 offers the option of using the block immediately to print schedules or to return to the menu.

The subroutine at line 3000 permits the replay of a recorded string. The separation of the array of entries uses the MID\$ command. The information can be displayed and a hardcopy created prior to

The student spectator sport starts in line 4000 where the user is prompted for the student's name, tutor group, the date this schedule is being created, and the number of subjects on this schedule. The last item is used in a FOR...NEXT loop which starts at the end of this line.

Line 4010 prompts for block number and subject code (four characters) which will have been allocated as a result of the student's interview with the admissions officer. When all subjects have been allocated, a reminder about the printer is again given with the flashterisk routine as a prompt. Any key will now activate the printer routine which starts in line 4020. The student's schedule is printed out in tabular form.

The flag variable Q which was set to zero in line 4000 is used to repeat the printing process in line 4040. This allows for multiple copies: one for the office and one for the student. If two-ply paper is used this will not be needed; or if the printer also punches a paper tape, then only one schedule copy need by printed since duplicates can be made from the paper tape.

The printing subroutine returns to 4010, and the program jumps to 4070 which prompts for another set of schedule data or a return to the menu.

It is not a polished program. For one thing, it was written and tested in a single day to fulfill a need which could not be delayed. For another, it would be much more useful to us if the room information were printed as well. It fulfilled its function, however, and was a vivid demonstration to enrolling students that our College is fully committed to the use of the TRS80 as well as to the teaching of computing. Next year, perhaps, an extended version will be able to handle even more of the effort of our admissions procedure. Meantime, I hope that this description will quicken the pulses of a number of readers who have been faced with similar problems.

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Circle 56

HI-TYPE G

For TRS-80 Model I

Steve Kelley Oakland, CA

This program acts as the driver routine for a Diablo HI-Type G daisy wheel printer, which allows it to run at maximum speed in the bi-directional, logic-seeking mode. The characteristics of the interface needed are discribed in Figure 1.

If you need a routine to operate your Diablo Hi-Type daisy wheel printer at it's fullest potential then your dinner will become quite cold while you finish this article.

How does one reposition a print head from the end of a 21 character line to the end of a 45 character line in a straight line, and then print the line backwards? Time to outline:

- I. Must print bi-directional.
- II. Must be logic-seeking.
- III. Must use hi-speed tabs on both directions.
- IV. Never more than one motion between printed characters and must be straight line (shortest distance).
- V. Must restore upon initialization and on receipt of control characters (i.e., 28).
- VI. Must home to left margin after reasonable delay without hardware or interrupts and without affecting position of subsequent characters printed.

The first draft of the program was quite bulky, and it contained a considerable amount of duplication. For instance, the routine to print from left to right was identical to the right to left routine except that the logical column (where the print head shoud be) is decremented after each character instead of incremented. The same was true of the routine to send the buffer characters to the print routine singly. Left to right the pointer started at the beginning of the buffer and was incremented and reverse printing was achieved by starting at the end of the buffer and decrementing after each character. Since the program was to reside in RAM, it could be made to be self-modifying, that is, after a line is printed in one direction, the program could modify itself so that the next time the same routine is called the opposite direction will result. Changing the increments at "DIR" and "SPACE" to decrements and the "BUFF" at "OUT1" to "BUFF + N" (for n number of columns) were all the changes necessary to implement both directions with one routine.

The logic-seeking part is a tough nut to crack, mainly because a lot of people don't really know what it means. Generally, it means that the carriage does not arbitrarily return to either margin while in use, but proceeds to the position where the next character

will be printed. So, save the characters until the whole line to be printed is received (otherwise it could not print backwards) and don't move the print head until a character needs to be printed. When is this actually done? If characters are stored, waiting for a CRLF (carriage return, line feed) and CRLF's are stored until ready to print, the program is always waiting and storing, never printing. The solution turned out to be very simple: Never print a line until a CTRL character is received (i.e., CRLF) and never position the print head until it is time to print a character. This takes care of items 3 and 4 of the outline. The complex calculations that might be necessary to position the print head are not needed. The entire buffer is sent to the print routine regardless of how long (or short) the line. Since spaces are not printed, but merely increment the logical column, the entire buffer's contents are "printed", but the print head is left over the last character printed. When the next line is sent, it will be printed in reverse, so all the spaces in the righthand end of the buffer will just decrement the logical column until a printable character is found. At this time the logical column (where the print head should be) is subtracted from the physical column (where the print head is) and the print head is moved the difference of the two, in the direction of the sign of the difference. Following the flow of the program, when several CRLF's are sent consecutively the entire empty buffer is sent to the print routine for each CRLF, which means that logically the printer is printing 132 spaces for each line. Logically, because the print head never physically moves during the process. If it did it would scan the entire length of the platen for each line like many bi-directional printers

When the Hi-Type routine is called with a printable character in the "C" register, the character is inserted into the buffer "BUFF" and the buffer pointer (at "INBUF") is incremented (see program listing). When a control character is received, things start to happen. "OUTBUF" is called and its contents are sent to the print routine ("HITYA"). Upon receipt of the first printable character, "MOVE" is called to position the print head from its last physical row and column (PROW & COL) to the row and column of the current character (IX+4 & IX+5) in a straight line. Actually, "MOVE" is called before every character printed, but normally only one character position is advanced. Last, if the control character received was

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Circle 53

a CR, the logical row is incremented, but the head is not actually moved until the next printable character causes "MOVE" to be called.

The RESTORE routine is straightforward and does just that. It restores the printer to the left margin, clears the program pointers and buffer. This is done at the time the Hi-Type program is loaded and executed and assures that the logical and physical pointers match. For instance, if the print head was at column 5 and the PCOL was 30, a hi-speed carriage return would have disastrous results. Oh, while we are on the subject of disastrous results, notice the title of the source program, "HITYPE G". Anyone interested in seeing some spectacular jams and crashes is welcome to try HITYPE A-F.

The home-to-left-margin routine wasn't easy. A counter had to be decremented while the print routine was not being used, and the carriage homed to the left margin when it reached zero. The keyboard check routine was intercepted for this purpose, so each time the keyboard is scanned, the counter is clocked. When the clock strikes ONE the mouse runs to the left margin. All pointers are also set to the leftto-right direction, and subsequent characters are printed correctly regardless of the position or direction when printing stopped. This counter is preset each time a new line is printed.

With any machine language program, changes may have to be made to run properly on your machine. The assumptions made about hardware are listed in Figure A, so get rid of your computer and interface and get one that matches these

Figure 1

Hardware Assumptions

The ORG statement assumes 64K memory protected at 64000 for Basic.

TRSDOS entry point is 402DH.

LPRINT jump vector of line printer routine is at 4016H.

KBSCAN jump vector of keyboard driver is at 4026H. IX is pointing at the device control block.

IX+4= line counter and IX+5= character counter.

Input character in register "C".
Time factor loaded into "TIME" in clear routine makes 1 second delay.

IN-PORT 37E8H

Bit 4 - Hammer busy

Bit 5 - Carriage busy

Bit 6 - Paper busy

Bit 7 - Fault condition

OUT-PORT 37E9H

Bits 0 & 1 - MSB of DATA word

Bit 2 - Direction

Bits 4 & 50 is print command, 1 is carriage command, 2 is paper command and 3 is restore command.

OUT-PORT 37EAH

Bits 0 through 7 - LSB of DATA word

OUT-PORT 37EBH

No data - strobes printer

parameters. On the other hand, if you wish to substitute the appropriate values for your computer and interface, you should have little difficulty in the modification. The WOS section of the program is the area affected.

Now the Hi-Type runs at maximum speed always taking the shortest and fastest route. It will print columns of information in both directions with

almost no extra time spent on long tabs. Truly an impressive sight to watch. Plotting is another story...

The source and object code of the program, with instructions and the short version (less than 100 bytes) are available on cassette for the TRS-80 for \$8 ppd. Help with interfacing is available if you send a SASE to the author at 9506 Peach St., Oakland, CA 94603.

-			www.		
	00100			*HITYPE G*	
	00110				
		;BI-DIR	ECTIONAL	LOGIC-SEEKING	*
	00130	•			The second of th
		KBSCAN		4016H	
	00150	LPRINT	EQU	4026H	
	00160	TRSDOS	EQU	402DH	
			ORG	OFAO1H	; FOR RAM AT 64K.
	00180	;			
	00190	HITYPE	LD	A,C	;MASK OFF PARITY.
	00200		AND	7FH	
	00210		LD	C,A	
	00220		CP	20H	; CNTL CHAR ?
	00230		JR	C, CNTLS	
	00240		PUSH	HL	;NO, PUT IN BUFFER.
	00250	INBUF	LD	HL,BUFF	
	00260		LD	(HL),A	
	00270		INC		;INC POINTER AND
1	00280	. :	LD	(INBUF+1),HL	;PUT IT BACK.
	00290		POP	HL	
	00300		RET	, , , , , , , , , , , , , , , , , , ,	
	00310				
		CNTLS	CALL	OUTBUF	;PRINT LINE IN BUFF.
1	00330		LD	A,C	
3	00340		OR	A	;NULL ?
	00350		RET	ž	;YES, ALL DONE.
1	00360		CP	ODH	;CR ?
3	00370		JR	NZ, CNTL1	NO, TRY AGAIN.
}	00380		INC	(IX+04H)	;INC LOGICAL ROW
	00390		RET	(17,0411)	FOR CR AND RETURN.
8		CNTL1	CP	1CH	RESTORE ?
3	00410	01411	RET	NZ	;NO, ALL DONE.
3	00410		VE 1	142	,NO, ALL DONE.
3		RESTOR	PUSH	HL	
	00440		LD	HL,3000H	;CMD WORD FOR RESTORE.
	00450		CALL	WOSA	; (WOSA DOESN'T WAIT)
	00450		CALL	CLEAR	
	00470		LD	HL,BUFF	;CLEAR POINTERS TO L-R.
	00470		LD	B,132	
		REST1	LD	(HL),20H	;SET BUFF TO SPACES.
	00500		INC	HL	VOLI DOLL TO SEMCES!
	00510		DJNZ	REST1	* * * * * * * * * * * * * * * * * * * *
	00510		POP	HL	
	00530		XOR		
	00540		LD	A (PROW+1),A	;ZERO PHYS ROW.
	00550		LD		
	00560		LD	(PCOL+1),A (IX+04H),A	;DITTO PHYS COL
	00000		LV	(TV±04U) N	;AND LOGICAL ROW.
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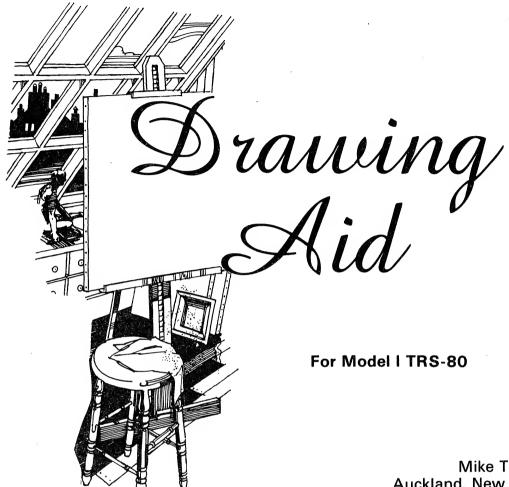
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00570	LD	(IX+05H),A	;SAME FOR LOGICAL COL.
00580	RET		
00590 ;			
00600 OUTBUF	PUSH	HL	
00610	PUSH	BC	
00620 OUT1	LD	HL,BUFF	;POINTER SET.
00630	LD	B,132D	;QTY OF COLUMNS.
00640 LOOP	LD	C, (HL)	CHAR TO C REG.
00650	LD	(HL),20H	;CLEAN-UP AS YOU GO.
00660	CALL	HITYÁ	;CALL PRINT ROUTINE.
00670 DIR	INC	HL	; INC (OR DEC) POINTER.
00680	DJNZ	LOOP	
00690	LD	A,(DIR)	; INDICATES DIRECTION.
00700	CP	23H	;LEFT TO RIGHT ?
00710	LD	A,2BH	HEX FOR DEC HL.
00720	LD	B,35H	;HEX FOR DEC (IX+NN).
00730	LD	HL,BUFF+131D	;END OF BUFF.
00740	LD	(IX+05H),131D	;LCOL SET TO RIGHT SIDE.
00750	JR	Z,DIR1	; IF L-R THEN A-OK.
00760	POP	BC	; IF NOT THEN SET UP
00770	POP	HL	FOR L-R WITH CLEAR.
00780 CLEAR	PUSH	HL	
00790	PUSH	BC	
00800	LD-	A,23H	;HEX FOR INC HL.
00810	LD	B,34H	HEX FOR INC (IX+NN).
00820	LD	HL,BUFF	;BEGINNING OF BUFF.
00830	LD	(IX+05H),0	;LOGICAL COL SET TO LEFT.
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Machine Language Application

00840 DIR1	LD	(DIR),A	;FILL IN THE HOLES
00850	LD	A,B	;WITH ALL THOSE HEX
00860	LD	(SPACE+1),A	;INSTRUCTIONS.
00870	LD	(OUT1+1),HL	, 2.10 · 110 · 120
00880	LD	HL,BUFF	RESET INPUT POINTER.
00890			PRESEL INPUT POINTER.
	LD	(INBUF+1),HL	
00900	LD	HL,OF800H	DECEM TIMES 01 001
00910	LD	(TIME),HL	;RESET TIMER CLOCK.
00920	POP	BC	•
00930	POP	HL	
00940	RET		
00950 ;			7
00960 HITYA	LD	A,C	;HERES THE PRINT ROUTINE.
00970	CP	20H	;SPACE ?
00980	JR	Z,SPAGE	;YES, JUST INC LCOL.
00990 CHAR	CALL	MOVE	GOT A CHAR, POSITION THE
			The state of the s
01000	PUSH	HL	;HEAD.
01010	LD	L,C	CHAR TO L AND
01020	LD	н, ООН	;PRINT CMD TO H.
01030	CALL	WOS	;SEND CMD TO PRINTER.
01040	POP	HL	
01050 SPACE	INC	(IX+05H)	;INC (OR DEC) LCOL
01060	RET		
01070 ;			
01080 MOVE	PUSH	HL	
01090	PUSH	DE	
01100			· * · · · .*
	PUSH	BC	T 77117A112 T 8AA 11FF m
01110	LD	A,(IX+05H)	;I THINK I'M HERE,
01120 PCOL	SUB	00H	BUT I'M REALLY HERE.
01130	LD	HL,1000H	; CMD FOR CARRIAGE MOVE.
01140	LD	В,06Н	;SPACE BETWEEN LETTERS.
01150	CALL	MOV1	;DO IT.
01160	LD	A, (IX+05H)	NOW I AM HERE
01170	LD	(PCOL+1),A	;AND I'LL REMEMBER.
01180	LD	A,(IX+04H)	
01190 PROW	SUB	ООН	; (NOW DO THE SAME THING
01200	LD		· ·
		HL,2000H	FOR PAPER MOVE)
01210	LD	В,08Н	;SPACE BETWEEN LINES.
01220	CALL	MOV1	
01230	LD	A,(IX+04H)	
01240	LD	(PROW+1),A	; NEW POSITION.
01250	POP	BC	
01260	POP	DE	
01270	POP	HL	
01280	RET		
01290 ;			
01300 MOV1	I.D.	NC MOVO	-CKID IE DOCITIVE
	JR	NC,MOV2	;SKIP IF POSITIVE.
01310	CPL		; CHANGE TO POSITIVE.
01320	INC	Α	V
01330	SET	02H,H	;SET DIRECTION BIT.
01340 MOV2	LD	E,A	;DIFF TO E.
01350	LD	D,00H	;ZERO D.
01360 MOV3	ADD	HL,DE	MULTIPLY TIMES B.
01370	DJNZ	MOV3	
The state of the s			

```
01380 :
01390 Wos
               PUSH
                        BC
01400
               LD
                        A,H
01410
               AND
                        OFOH
                                          GET WAIT MASK FROM CMD
01420
               JR
                        NZ,WOSZ
                                          ;WHICH DOESN'T ALWAYS
01430
               LD
                                          ; WORK SO CHECK FOR ZERO
                        B,10H
01440
               JR
                        WOS1
                                          ;AND USE 10 IF SO.
01450 WOS2
               RLCA
                                          MAKE MASK FROM NON-ZERO
01460
               LD
                        B.A
                                          : CMD.
01470 WOS1
               LD
                        A, (37E8H)
                                          GET PRINTER STATUS.
01480
               AND
                                          ; MASK OFF OTHER BITS.
01490
               JR
                        NZ, WOS1
                                          ;LINE IS BUSY, CALL BACK.
01500
               POP
                        BC
01510 WOSA
               LD
                        A,H
                                          CMD WORD MSB TO A
01520
               LD
                        (37E9H),A
                                          ; AND TO PRINTER.
01530
               LD
                        A,L
                                          CMD WORD LSB TO A
01540
               LD
                        (37EAH) A
                                          ; AND FOLLOW MSB.
01550
               LD
                        (37EBH),A
                                          STROBE PRINTER
01560
               RET
                                         ; AND GET OUT OF HERE.
01570 ;
01580 POWER
               LD
                        HL, (KBSCAN)
                                         GET KB ROUTINE ADDRESS
01590
               LD
                        (CLOS1+1),HL
                                         ; AND CLOSE WILL JP TO IT.
01600
               LD
                        HL, CLOSE
                                         GET CLOSE ADDRESS
01610
               LD
                        (KBSCAN),HL
                                         ; AND KB WILL JP TO IT.
01620
               CALL
                        RESTOR
                                          RESTORE PRINTER.
01630
               JP
                        TRSDOS
                                         BACK TO MAIN SYSTEM.
01640 ;
                                         ;NOTE: LOAD PROGRAM ONLY
01650 ;
                                         ;ONCE OR IT WILL LOCK UP.
01660 ;
01670 CLOSE
               PUSH
                        HL
01680
               PUSH
                        IX
01690
               LD
                        IX,4025H
                                         ;DCB OF PRINTER.
01700
                        HL, (TIME)
               LD
                                         ;GET THE CKOCK COUNTER.
01710
               INC
                        HL
                                         ;TICK-TOCK.
01720
               LD
                        (TIME),HL
                                         ;PUT IT BACK.
01730
               LD
                        A,H
01740
               OR
                                         ;HOW'S IT DOING ?
01750
               JR
                        NZ, CLOS2
                                         ;SKIP IF NOT TIME.
01760
               CALL
                        CLEAR
                                         ; POINTERS TO L-R.
01770
               CALL
                        MOVE
                                         ;GO TO LEFT MARGIN.
01780 CL0S2
               POP
                        IX
01790
               POP
                        HL
01800 CL0S1
               JP
                        0000H
                                         *KBSCAN GOES HERE.
01810 ;
01820 TIME
               DEFW
                        0000H
                                         ;HAD TO PUT IT SOMEWHERE.
01830 ;
01840
               DEFS
                        50
                                         ;ELBOW ROOM.
01850 ;
01860 BUFF
               DEFS
                        132D
                                         ;BUFFER. LENGTH OPTIONAL.
01870 ;
01880
               ORG
                        LPRINT
                                         ;LOAD HITYPE ADDRESS OVER
01890
               DEFW
                        HITYPE
                                         ;THAT OTHER ONE.
01900 ;
01910
               END
                        POWER
                                         ;SO EXECUTE DOES POWER-UP.
```



From time to time many of us have need to express on paper what isn't simple with words. So we avoid the task because we can't get it right or we need too many words. (Did someone say a thousand?)

This simple program takes points from an X-Y-Z matrix and converts them to an X-Z plane, permitting isometric and perspective sketching and drawing. It replaces laborious calculations and skilled drawing board work, permitting rapid examination of complex shapes by quick plotting on graph paper. And, it wins hands down on trial and error examination of shapes to insure the best presentation of information.

Best applications for the program are aiding visualization of three dimensional objects, especially for complex or curved shapes. When using other than 90 degree viewpoints the program will often show up anomalies.

The program will locate the vanishing points of perspective which is a real aid to final production. This is especially good for those who prefer to add the detail after the main framework has been drawn.

The input data is often arbitrary. If the results are not satisfactory the data can easily be manipulated in the command mode of Basic (see pages 6/4 in the Level II Manual).

Mike Tattersall Auckland, New Zealand

View Problems

One look at Figure 2 and you will see visualization can be a problem. You can get around this in several ways: (1) Unless one is desirous of a worms-eye or special view it always pays to have the origin outside the figure (see drawing 1). (2) Choose an object of roughly similar dimensions, run it and play around with the viewpoint and scale until all is clear. (3) It often helps to add some reference spot on one side to identify it, especially in symmetrical figures. (4) Another trick is to shade the inside surfaces or to number the points in your drawing as well. (5) Avoid using too much detail too early in drawing the piece because the clutter will confuse the eye.

The Program

Actual calculation is only 18% of the program. The rest is input, output and management. Instructions are kept to a minimum as experience has shown there is no substitute for trial and error.

The horizontal view angle moves the eye counterclockwise in the Y plane away from the negative end of the X axis. The vertical view angle raises the eye above that point in the Z plane. The view distance is scalar, although at infinite view distances there is no distortion of scale or slope. As the viewpoint (eye)

gets closer to the object the vanishing points also get closer with consequent distortion just as the eye would see it. This will be true until the vanishing points are in scale and plottable. (See Figure 3).

The view elevation simply moves the drawing up/down the Z axis. It is useful if numerous points are needed on one sheet with vertical separation. Many buildings on one sloping site, each drawn by itself but all related to a site data, would be a good application of this.

The stereo angle can be used for enhancement. By using very small angles a thick/thin effect can be seen with overlapping views. However, its primary function is for stereo drawings. Those who need this function will understand its use. Used for enhancing, it is a gimmick, and a poor one at that. With the proper viewer, it comes into its own. Stereo views can be very hard to produce. But for example, with this program, multi-story buildings can be "looked into" to aid location of interior objects. Or, the inside of a yacht can be viewed and internal detail can be sketched in.

The reference object used in the drawings is a tape recorder like the ones accompanying the Model I. Pick it up and try to decide what angles will best show the recording head. Decide on the angles, set up the matrix, steal the kid's ruler and graph paper and have a go.

Problems with the Program

Right away problems emerge. Look at Figure 2. All three sketches show the same output and all are the same, aren't they? They are all plotted results from table 1, but the lowest plot is wrong. It's a mirror image.

If you blink at the top view of Figure 2 it will turn inside-out for you.

In some cases the SIN, COS and ATN functions have sign problems and hidden points go upsidedown, but these only happen when trying extreme angles. However, 99.9% of the time these don't affect the final result, as the angle can be changed or the data shifted to get away from the problem.

Table 1 shows the input/output of the matrix for Figure 2. Use it to prove your keying of the program.

Note the unsuitability of the view distance chosen for Figure 3. It gives miles too much distortion, but it does demonstrate the effect of perspective. The only true scale views are isometric and the parameters for these are remarked in the program.

Other Notes

Figure 4 shows how the object moves as the view point changes, letting different parts be shown as required. The top view is: HA=30, VA=10, VD=9E9, and VE=0; the middle view is: HA=50, VA=30, and the rest is the same; the lower view is: HA=70, VA=50 and the rest is the same. The combinations are endless.

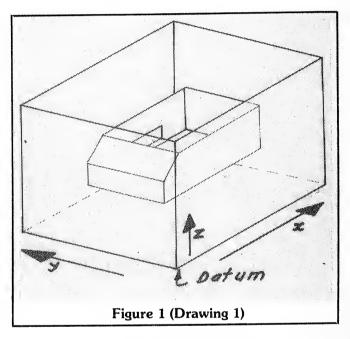
With 16K Level II, you can process some 350 points, not an unusual number for this type of

program (i.e., a yacht's lines contain 300 odd points). A 4K Level II user will need to delete the instructions and line printing sections and, by a bit of judicious trimming elsewhere, be able to handle 40-50 points.

The program doesn't like to divide by zero, so you must (within scale limits) avoid values of zero in your X-Y-Z matrix. Move a little way off them. Line 580 prevents scientific notation from messing up the video layout, but can be removed if wanted.

As there are a few trigonometric functions, conversion is slow in a big matrix. To settle fears of lockup or endless looping, the current point being processed is flashed on the screen.

Presumably the trig functions are simply a hardware version of the routines in the Level I manual. There seemed no point in going to machine



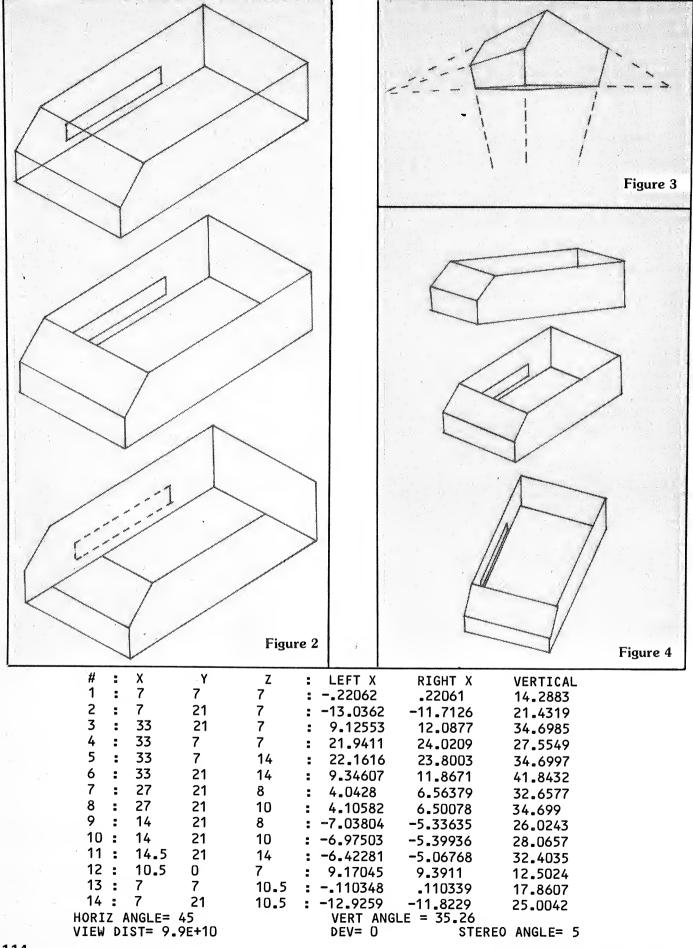
language calls to speed these up. Efforts to speed things up elsewhere showed that X*X was much faster than X raised to the second power (using the up arrow). Integers control the loops for speed. Since they made no difference elsewhere, the A1's and D2's, etc., were retained for clarity.

The program could stand a lot of improvement. However, it is a working tool, not a demo thing.

Two small changes possible are rejection of zero in the input and suppression of the right-X in the display and listing (right-X begins the stereo X-value for the right eye view). Line 750 is a printing pause, delete it if you don't want it.

Most end users of this program, like draftsmen, illustrators, architects, designers and engineers, will know what they want straight away. Lecturers and magazine contributors and those who fiddle will use up a lot of graph paper in achieving the desired results.

And get in a stock of bananas, too!
(Program listing starts on page 116)



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ACCEL/ACCEL2 SPEEDUPS

TRS-80 Model | BASIC Compilers

table below shows the BASIC subset translated by ACCEL and ACCEL2 to machine code. Figures represent the minimum expected ratio of execution times, compiler to interpreter. All other BASIC statements and functions run at interpreter speed after compilation.

		INTEGER	SINGLE	DOUBLE	STRING
	Assignment (LET)	115	3.3	3 4	7.6
	Array Reference (1-dim)	35	78	66	34.5
	AND or OR	41	2.5	2.0	
	Compare (< ,etc)	30	1,6	1 4	4.2
	Add, Subtract, Concat	47	2.0	1.5	4.9
	Multiply (*)	3.3	2.0	1.5	
	Divide (/)	2.0	2.0	1.02	
	Reference to a constant	69	65	54	2 1
	FOR with NEXT	15			
	POKE	82	4.6	3.6	
	SET or RESET	6.7	3.1	2.6	
	IF THEN ELSE	11.1	3.0	2.3	7.6
	ON expression GOTO	15.8	3.2	2.8	
	Functions				
	VARPTR	33	47	47	44
	USR	11.2	3.7	2 8	
	POINT	6.9	3.0	2.5	
	PEEK	52	4.4	3 5	
	LEN			• •	43
	MID\$				4.1
	LEFT\$				3.0
	RIGHT'S				3 0 2 8
	CHR\$				47 .
	ASC				30
	CVI				28
	Flow of Control				
	GOSUB with RETURN	137			
	90T0	204			
	All other BASIC	-54			
	statements and functions	1.0	1.0	1.0	1.0
40	CEL . For 16V TDC 90 Model				

ACCEL: For 16K TRS-80 Model I. Compiles boldface subset in INTEGER variable type. Compiletime size 2816 bytes, run-time size 256 bytes. Trade up later to ACCEL2 for the price difference.

ACCEL2: For 32K TRS-80 Model I. Compiles subset in all variable types Compile-time size 5120 bytes, run-time size 1024 bytes. Local and Global options help control growth of the compiled code Output save to Disk, Stringy/Floppy, TR\$008 and most vendor DOSs supported. Use ACCEL2 during BASIC program development for easy huge speedups.

\$88.95 + 1.50 shipping TSAVE: Writes ACCEL/ACCEL2 compiler output to independent SYSTEM tape.

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Circle 4

TRS-80, TRSDOS tm Radio Shack Stringy/Floppy tm exatron, inc



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Circle 63

740 GOT0600

750 FOR PA=1 TO 60:NEXT PA:RETURN

AND SCALE IS THEN CORRECT

770 REM * VANISHING POINTS ARE AT *

760 REM * ISOMETRIC VIEWS USE : HA=45 VA= 35.26 VD= 9E9

9E9,0,0 FOR X AXIS

0,9E9,0 FOR Y AXIS 0,0,9E9 FOR Z AXIS

PRINT"VIEW DISTANCE=";VD, "ELEV="; VE:IFSA=O PRINT" ": ELSE PRINT"STEREO ANGLE =";SA/C1

440 PRINT"ENTER 999 FOR MENU";:INPUTM: IFM<>999 GOTO430 ELSE GOTO 600

450 FORI=1 TO PN

460 PRINT@480," ":PRINT@480,I

470 X=ST(I,1):Y=ST(I,2):Z=ST(I,3)+VE 480 D1=SQR(X*X+Y*Y):

A1=ATN(Y/X)+HA490 YN=D1*SIN(A1):

116

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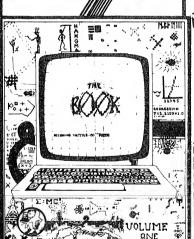
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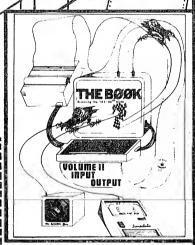
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NEW PRODUCTS

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Computerware announced its POWER PACK for the Radio Shack Color Computer. The Power Pack cartridge plugs into the Color Computer's interface slot, providing 6K additional RAM memory and a powerful 2K monitor. The monitor provides the sophisticated programmer 33 machine level commands and many utility routines. With its extra memory and routines in ROM, this new Power Pack allows Computerware and other software sources to supply users with much more sophisticated software on cassette at much lower prices than the ROM packs currently available. Computerware also includes with the Power Pack a free cassette of diagnostics for the Color Computer. Already available for use with the Power Pack is Computerware's Color Editor (\$24.95), Color Assembler (\$29.95), and Color Invaders (\$19.95). The Power Pack is available directly from Computerware, Box 668, 1512 Encinitas Blvd, Encinitas, CA 92024 (714) 436 3512 at the introductory price of \$159.

Circle 112

Proofreader by Soft-Tools

Proofreader allows your TRS-80 to check your documents for spelling errors. It will work in conjunction with almost any word processor for the TRS-80 such as Scripsit or Electric Pencil. After a document has been prepared, Proofreader will scan it and check all words in its own 38,000 word dictionary. It also can check a user supplied auxiliary dictionary containing technical words, names, etc. not found in the master dictionary. Any words not found either in the master or user dictionary are then listed on the screen, and may be saved in a file and printed. Proofreader is a machine language program and is fast. Almost any size document can be checked in under 5 minutes on the Model I and III, and even less time on the Model II. Once the misspelled words are found, the original document can be corrected to remove the errors. Proofreader is an invaluable tool for anyone who uses the TRS-80 for word processing. All versions of Proofreader require an operating system compatible with the latest version of TRSDOS and at least one disk drive. Prices are \$54 for Model I, \$64 for Model III and \$109 for Model II. Contact Soft-Tools MHE Box 14, Tijeras, NM 87059

Circle 113

The Rhythm Box

The Rhythm Box is a new computer peripheral that synthesizes the sounds of seven different percussion instruments including bass drum, wood block, snare drum, short cymbals, long cymbals, handclap, and tom-tom. It is easy to program in Level II Basic or assembly language; a single OUT instruction generates any combination of percussion sounds plus a loudness control for rhythmic emphasis. It was designed for game players, computermusic enthusiasts, music teachers and professional musicians who want to create anything from a simple repetitive rhythmic pattern to a long continuously varying percussion score. The Rhythm Box is available with two interface options: Model RBX-T (\$149.50) for the Model I Level II TRS-80 has a 40-pin ribbon cable that plugs into the keyboard or El bus extension connector. The Model RBX-S is for all other computers. Include \$3.00 shipping and handling. An audio demo cassette is available (US only) for \$1. Contact Newtech Computer Systems, Inc. 230 Clinton Street, Brooklyn, NY 11201 (212) 625-6220



Circle 109

TRS-80 Cheaptalk

CHEAPTALK is a TRS-80 software package which allows your computer to talk through any small audio amplifier connected to the cassette output plug. Utilities are provided to convert spoken words into self-contained subroutines usable in Basic or Z80 assembly language programs. These routines are easily merged with your own programs to add the dimension of speech. Cheaptalk is \$19.95 ppd from Alan Saville, PO Box 5190, San Diego, CA 92105 (714) 264-8266

Circle 111

Cribbage for Models I & III

This classic card game is now being offered for the TRS-80 Models I and III. Following Hoyle, this program has fast response time and clear playing format. Ideal for learning (includes a HELP command), Cribbage also can and has, stumped the experts. Cribbage is written in Basic with machine language patches and will work on Level I, II or DOS systems. Price is \$16.95 on cassette, \$19.95 on disk. For further information call or write The Alternate Source, 1806 Ada Street, Lansing, MI 48910 (517)487-3358

Circle 108

New Diskettes from 3M

A double sided, double density 51/4 inch diskette has been added to the Scotch diskette family by 3M's Data Recording Products Division. The Scotch 745 diskette has an unformatted capacity of a half megabyte. Sector-hole configurations are 0, 10 and 16. The rated density is 48 tracks per inch and 7958 bits per radian. Improved surface finish provides cleaner operation and better electrical performance than in previous comparable diskettes, 3M says. The 745 has a reinforced hub to promote reliability and long life. The new Scotch diskette has a suggested list price starting at \$7.30, depending upon quantity and packaging. Further details may be obtained by writing to Dept DR81-4, Box 33600, St Paul, MN 55133

Circle 101

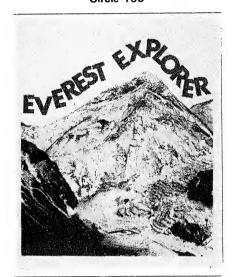
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The BLUE BOOK is a directory of computer manufacturers, peripheral equipment manufacturers and suppliers, software sources, books and magazines, software media, and virtually any computer related product. The BLUE BOOK takes up where other directories leave off. Anyone with a computer related product may advertise in the BLUE BOOK. It is published annually and distributed nationally. The BLUE BOOK is indexed by computer type, manufacturer and product. Even software authors with a single listing are indexed. For further information on the BLUE BOOK, write or call: 1510 South 97th Street, Tacoma, WA 98444 (206) 537-8155

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Circle 103



New Simulation Game

Acorn Software Products, Inc., announced the release of EVEREST EXPLORER, a simulation game for the Radio Shack Level II. Assigned an expedition budget, the player must select manpower, food, fuel, shelter and oxygen supplies needed to support the climb. Weather conditions, choice of route, climbers' condition and morale all play key roles as you accept the challenge of one of life's most dangerous ventures. Available for TRS-80 Model I Level II. 16K for \$14.95 on tape. The 32K version, including a "save game" option and other enhancements is \$20.95. Contact Acorn Software Products Inc., 634 N Carolina Ave SE, Washington, DC 20003

Circle 114

Stock Market Pulse

Max Ule & Co Inc is introducing Stock Market Pulse, a new service that instantaneously computes and displays the Dow Jones Industrial Average on a personal computer. Stock Market Pulse is a new optional feature of Tickertec, the computerized stock market quote system without a 15 minute delay. This new service is offered to purchasers of top of the line versions of Tickertec, recently

described by Fortune Magazine as the "Tapewatcher's delight". With Stock Market Pulse, Tickertec computes the Dow Jones Industrial Average and displays continuously this widely accepted market indicator with the net change from the previous day's close on a personal computer. This service is available for versions of Tickertec designed to run on the Radio Shack TRS-80 Model II and other computers that use the CP/M operating system. For a free brochure on Stock Market Pulse and Tickertec, call Max Ule & Co, Inc, the distributor, toll-free at (800) 223-6642, in New York call (212) 687-0705

Circle 115

Communication Packages

Small Business Systems Group of Westford, MA has a complete line of communication packages developed by Lance Micklus and designed for use with TRS-80 microcomputers. These packages interface with any time sharing computer which communicates in ASCII. The family of products offers communication capabilities to users with even the most minimal hardware configurations. There has been wide interest in these products from communication "buffs", the educational community, , businesses needing to provide linkage between departments and/or divisions, and those who need to communicate with large computers on a regular basis. For further information contact Small Business Systems Group, Inc., 6 Carlisle Road, Westford, MA 01866 (617) 692-3800

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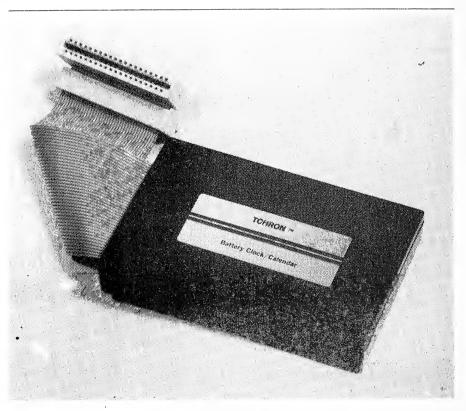
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Circle 106

Clock/Calendar for Mods I & III

TCHRON, by WEB International, is the first complete, compact, self-contained real time clock for the TRS-80 that never sleeps. It has its own "keep alive" power supply, which allows it to continue to run when your TRS-80 is turned off, or experiences a power failure. When you turn on your computer or power is restored. TCHRON will provide instantaneous MO/DATE/YR, day of week, HR:MIN:SEC and AM/PM information. TCHRON retails for \$99.95 and may be purchased directly from WEB International or through their dealer network. They expect to introduce a TCHRON model for the Model II also, Direct inquiries to: WEB International, PO Box 96, Corona Del Mar, CA 92625 (714) 494-2869



notes

Model II users: While in Basic it is possible to generate an I/O error when you call for your printer if you forgot to turn it on or it was not selected. If this is the case, correct the printer fault (turn it on, plug it in, whatever) and CONT the program. TRSDOS will automatically reinitialize the printer and the program will continue. However, if your program error traps, it is possible that you will find yourself out in left field. The same is true if you needed a special FORMS configuration.

When entering long data statements, I always add a checking routine, numbered above the last line in the program. For example:

50000 FOR X=1 TO 100 : READ D

50010 PRINT X;"=";D;" "; 50020 SS=SS+D: NEXT

In the case of some programs, the FOR loop should start with zero and should be made larger than the largest number of data elements. After entering each data line, I type RUN 50000, and get a listing which is easy to check against copy. When it runs, you get an OD ERROR message which you ignore. The SS provides a check sum, which you examine by typing PRINT SS. I would like to suggest that all authors of programs with lengthy data statements provide, in a REM statement, the number of items and the check sum after each DATA line.

-Ralph Nottingham

Ralph Nottingham also wrote of a problem which may have bugged some of you at one time or another. Having entered about six lines of Leo's Line Packing article of last issue, he saved the program and then typed EDIT255. The computer indicated there was no such line number. When he typed LIST250—, the program listed properly. When he tried to list or edit 255, however, he couldn't find it. Clearing the memory, and reloading the program didn't solve the problem.

We ran into this many moons ago. Somehow, a glitch changed a bit in memory and caused a similar problem. In our case, a bunch of garbage appeared between lines while listing a program. In calling the program back from disk, it was still there. The only way we could get rid of it was to start completely over. And ours was a long program! It is generally felt that the Basic Pointer gets fouled up and points to the wrong spot in memory

Line glitches of this nature can come from many sources. One of the most common is static electricity. Another is line noise from a refrigeration unit of some sort.

Model I users: Under some DOS's it is possible to wipe out your disk directory while running a Basic program. How do you do it? Kill a file which has not been closed from Basic. TRSDOS will crash the directory. LDOS, DOSPLUS and NEWDOS80 will not, though the latter will come back with an error message. LDOS simply closes the open file first. If in doubt as to what your DOS does or doesn't do, try the following program:

10 X=0

15 X=X+1

20 OPEN"R",1,"TEST1"

25 PRINT "AT 25"

30 OPEN"R",2,"TEST2"

35 PRINT "AT 35"

40 OPEN"R",3,"TEST3"

45 PRINT "AT 45"

50 KILL "TEST1"

55 PRINT "AT 55"

60 KILL "TEST2"

65 PRINT "AT 65"

70 KILL "TEST3"

75 PRINT "AT 75"

80 CLOSE

85 PRINT "ROUND # ";X

90 GOTO 15

-Dr Bruce Armstrong

Here is one of the quickest memory tests on record. While not fool-proof (is anything?), it will run equally well on the Model I, II, III and Color Computers. Type in the following *without spaces* and RUN it:

1PRINTMEM:GOSUB1

The computer will display a rapidly descending number on the screen. This is the amount of memory left as the stack fills with the instructions for executing a RETURN statement (which it will never find). At the conclusion of the test, if properly executed by the computer, the program will crash with an OUT OF MEMORY message and the number will have reached something around 50 or 60. This varies with computer and memory size at the beginning of the test.

Should there have been a glitch in the memory, the program will (usually) crash with some other error message or freeze and lock-up.

The programmer may find it advantageous to include a line similar to the one below to maintain consistancy of file name, drive, etc., when saving the latest updated version of his program:

59999 STOP

60000 CLS : PRINT"SAVING PROGRAM" : SAVE "PROGRAM:X"

X=Drive# and line 59999 avoids cashing into the SAVE command. To use, simply type: "RUN 60000".

-Donald J Goodwill

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- Routines to convert from one assembler format to the other

This course was developed and recorded by Joseph E. Willis, for the student with experience in assembly language programming; it is an intermediate-to advanced-level course. Minimum hardware required is a Model I Level II. 16 K RAM one disk drive system

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pendix contains a detailed tab run of a 100 consecutive race system workout showing an amazing 50% return (\$1.50 returned for each \$1.00 flat wager) includes many features such as error correction, bubble sort, line printer output, automatic keyboard debounce, archiving, etc. The manual may be ordered separately for perusal for \$7.95 and credit

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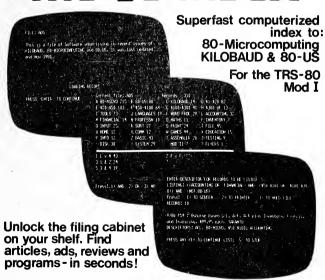
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Requires 48K TRS-80* Mod I with 2 Drives & TRSDOS TRS: 80 is a registered trade mark of Radio Shack

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Model I users: Did anybody ever mention that SCRIPSIT works great as an editor? Here is the sequence:

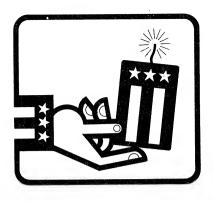
- (1) Save the BASIC program to be edited in the **ASCII** format
- (2) Load SCRIPSIT
- (3) Load the program to be edited
- (4) Edit the program
- (5) Save the edited version with the ASCII specifier (S,A)

And now you have an edited version of your Basic Program. This is especially handy if you have to do any global changes, such as changing PRINT to LPRINT or visa-versa.

If you are having problems getting results with double precision addition, subtraction, and so forth, try the following program to determine which works for you. Each Model of the TRS-80 family works a little different. One should work for you. In particular try 8000.22 and -8123 as your values.

- 10 ' PROGRAM TO DEMONSTRATE PROBLEM
- 20 ' WITH DOUBLE PRECISION ADDITION
- 30 AND A POSSIBLE FIX
- 40 1
- **50 CLS**
- 60 INPUT "ENTER A#"; A#
- 70 PRINT
- 80 INPUT "ENTER B#"; B#
- 90 PRINT
- 100 C#=A#+B#
- 110 D#=VAL(STR\$(A#+B#))
- 120 E#=VAL(STR\$(A#))+VAL(STR\$(B#))
- 130 F#=INT((A#+B#)*100#)/100#
- 140 G#=INT((A#+B#)*100)/100
- 150 LPRINT"A# HAS A VALUE OF"A#
- 160 LPRINT"B# HAS A VALUE OF"B#
- 170 LPRINT"C#=A#+B#"
- 180 LPRINT"RESULTS IN -->"C#
- 190 LPRINT
- 200 LPRINT"D#=VAL(STR\$(A#+B#))"
- 210 LPRINT"RESULTS IN -->"D#
- 220 LPRINT
- 230 LPRINT"E#=VAL(STR\$(A#))+VAL(STR\$(B#))"
- 240 LPRINT"RESULTS IN -->"E#
- 250 LPRINT
- 260 LPRINT"F#=INT((A#+B#)*100#)/100#"
- 270 LPRINT"RESULTS IN -->"F#
- 280 LPRINT
- 290 LPRINT"G#=INT((A#+B#)*100)/100"
- 300 LPRINT"RESULTS IN -->"G#
- 310 END

Notes Cont. On Page 127



Level II Basic Instruction Course Parts I and II Radio Shack 26-2005 and 26-2006

> \$14.95 and \$19.95 Model I

Computer Aided Instruction (CAI) has been an active part of education since the earliest days of keypunching. Nothing is more natural than having a computer teach you how to program a computer, and Radio Shack has two instructional packages: in Basic for the TRS-80. Both packages are written in Level II Basic. Part I is for 4K machines and the more advanced Part II package is for 16K machines. All programs are on tape, but can be loaded on disk systems with little effort and no need to rewrite the routines. The programs build upon each other, and you are recommended to work in sequence from lesson 1 of Part I to the end.

The Part I set of programs (\$14.95) consists of four cassettes with 27 different lessons. Radio Shack has greatly improved its educational programs. The routines are wellwritten, easy to follow, and make good use of graphics and flashing displays. The sequence of instruction is different than that used in most beginning courses, but it presents no great problem. The tutorial on editing seems premature. It seems the READ DATA command should have been presented earlier and the use of the INPUT command should have been saved until later:

The Part II programs cover the following topics: line numbers,

variable types, input, list, run, editing, print formats, evaluating expressions, if then, goto, read data, arrays, loops, for next, special functions, graphics, gosub, on goto and gosub, and restore. The use of graphics to highlight key lines and program execution is excellent, especially in the IF-THEN lessons. It would be recommended that the ELSE command be included at this time but it was not. Also the author's choice of totally random line numbers in their examples was unnecessarily confusing to beginning students.

The Part II programs (\$19.95) continue the instructions for 16K users. This set of four cassettes and eight lessons go into much more detail than the earlier lessons of Part I. Topics are: list, edit, variable types (more extensive than before), arrays, operators and commands, input and output commands, strings and string manipulations, special features (such as ERL, etc.) and machine language subprograms.

These programs were as well developed and carefully written as the Part I lessons. For many of the commands, instruction was by example and was very similar to the Level II Manual. After trying two separate tapes, I was unable to load a good copy of the machine language lesson. The operators and commands portion does a superb job with logical expressions and Boolean Algebra.

All programs use a self-pacing INKEY\$ routine. This allows you to have new information displayed as you are ready. The video formatting is well planned and makes programs easy to follow. The descriptions are clear and concise. At the end of major sections, you are given a multiple choice question. If you are wrong, an explanation is given. If your answer is correct, the reasons the other answers would have been wrong are displayed. This is a nice feature, as very often with CAI material, a student can guess a correct answer, move on. and never really understand the concept.

I plan to make extensive use of the lessons in my computer classes; they are a fine aid to education. If you are looking for a tutoring aid in learning Level II Basic, these are well worth the price. Keep in mind though, that the lessons aim to teach you commands and an understanding of the TRS-80, they do not cover how to write a program.

Cameron Brown

Organ

The Byte Miser Software 720 West Haven Blvd Rocky Mount, NC 27801 \$12 4K tape; \$15 disk Models I & III

Are you an aspiring organist? Do you want to tickle the ivories and see if you can really play a Bach Fugue? Here is your chance.

ORGAN is a machine language program for the TRS-80 Model I or III. It will run in as little as 4K, but requires Level II. The program will allow you to play in real time, press a key and voila' you have music? Well, you do if you plug the cassette output into an amplifier.

As you load the system tape a two manual keyboard will be drawn on the screen. The keys of your TRS-80 keyboard correspond to the relative position of the white and black keys of a small two-manual organ keyboard (you know, the \$69.95 Christmas special). The (screen) keys are labeled with the corresponding keys of your TRS-80 keyboard and when you press any key, an asterisk will appear on the corresponding key represented by the screen.

As with the sound produced by most other programs, the system is capable of producing one note at a time through the cassette output. However, Organ will also allow "chords" to be played as well, by pressing more than one key at a time. The sound will then alternate between the two or more keys pressed at a rate established by a 'tremolo" value. This rate remains the same regardless of the number of keys pressed: four notes will take twice as long as two notes to produce. And due to the keyboard matrix arrangement, pressing two or more keys will sometimes introduce additional unwanted notes.

The program has additional features: (1) a loudness control which allows either loud or slightly softer. The range here is minimal. (2) Timbre, or sound quality, which can be toggled between two values, one of which is fixed as kind of a clarinet sound; the other which can be a reedy "Christmas special", to an almost trumpet quality. (3) The value of the second sound quality mentioned in (2) above. This can be any of ten values. (4) The rate of tremolo which can also be any of ten values. The slower rate is smooth in its transition from tone to tone, but does not produce a true chord. The fastest rate, on the other hand, would produce a tone were it

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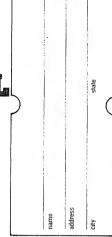
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not for "keying" that has a tendency to introduce a buzzing sound and destroy the effect that otherwise could be had. This can be overcome as Richard Taylor so effectively demonstrated in his version of the William Tell Overture of his TRS-80 Opera program.

Is it worth the \$12 or \$15? The reaction has been a qualified "yes". It does add a new dimension to our TRS-80 and has been a lot of fun. It does not attempt to replace the real thing. But then, it does do as good a job as the Christmas special (except in chording) and offers a wider range of sound.

Clay Caldwell

Upper/Lower Case Conversion **Motor Control** Modification Kits for Centronics 779/Radio Shack LP I **Printers** Service Technology 3844 Spring St., Box 1426 Nashua, NH 03061

Are you annoyed by the fact that the motor on your printer is constantly running when you're not actually printing something out? And how many times have you lost data on a printout because you turned off the printer to stop that irritating noise and to save juice, and then forgot to turn it back on before your program tried to use it?

Well, Service Technology has a simple modification kit that automatically turns off the printer motor 8 seconds after the last buffer was printed, and then turns it back on the moment your program sends more data to it, without losing any of the data.

This saves wear and tear on the lineprinter, increasing its useful life and decreasing your maintenance costs, and reduces the amount of electricity you need to power your system (not to mention allowing you to do your part to conserve energy).

This modification is very simple to install: It requires only a screwdriver and the ability to follow easy directions and read a simple diagram. It uses a small circuit board that snaps into the back of your printer cabinet, and makes all of its electrical connections by using snap-hooks instead of messy soldering.

Its cost is relatively high, \$95.00. but worth the price in view of the advantages it delivers. Ask for Conversion Kit #2.

The other kit of interest to those who want to use a word-processor with their computer, but who do not have the money to buy a new printer to replace their old one (even allowing for trade-in value, the difference in price is more than several hundred dollars).

Conversion Kit #1 is an uppercase/lowercase modification. which gives your printer the capability of printing the full 96 ASCII character set, with or without a slash through the zero (be sure to specify which one you want when ordering). And its cost is a modest \$125.00.

Like the other kit, this requires only a screwdriver and the ability to follow the directions in snapping out the old character generator chip, snapping in the new circuit board, and attaching the snap-hook connectors to the proper leads.

These kits were designed, and are sold by an ex-Centronics engineer. He worked for them for many years and knows his way around the inside of Centronics printers.

There is one thing potential owners of this last modification should know, and it has nothing to do with the modification itself: If you are planning on using this mod with the Electric Pencil, you may experience some problems. When I used my copy of Electric Pencil with the converted Line Printer I, I ran into constant problems with buffer overflow (usually after the first page), and lost large portions (up to half a line in some instances) of each line output to the printer.

The problem was finally traced to a lack of proper Electric Pencil to lineprinter handshaking. The Electric Pencil was not bothering to check the busy status line from the printer, so that when the printer buffer was full, the Electric Pencil still sent it data. resulting in lost data.

Just to be sure that it wasn't the printer I tried the Electric Pencil with a Texas Instruments 810, and had the same results except that it took place after about 10 pages. As a last test I borrowed a friend's copy of Scripsit and tried it with both printers. There was no lost data.

So, if you use this mod on your printer and you experience this type of lost data problems when using the Electric Pencil, try using Scripsit.

Yvon Kolya

Missile Attack Adventure International Box 3435, Longwood, FL 32750 Model I and III, \$14.95 tape and \$20.95 disk

"Missile Attack" is a captivating program modeled after Atari's extremely popular arcade-game, "Missile Command". It is written in machine language by Philip Oliver of the Cornsoft Group, and is sold by Adventure International

The object of "Missile Attack" is a rather simple one: defend your cities from an enemy missile onslaught. Unlike the arcade game, you have only two missile silos instead of three, and only three cities as opposed to six. You must use your missiles to destroy incoming enemy missiles in the air or else they will hit either a city or a silo and totally devastate them, causing the unfortunate site to disappear in a puff of smoke.

Your two silos are situated at the extreme lower left and right corners of the screen. Before every attack each silo is equiped with 15 anti-ballistic missiles (ABM's). Between the two silos are your cities. At the beginning of the game you are given three cities which are to be defended at all costs. You cannot earn bonus cities to replace ones that have been obliterated, therefore, keeping them in one piece is your prime requisite. The silos, on the other hand, will be rebuilt if you can keep at least one city intact till the end of the barrage

When the game begins, you start to see the enemy's missiles fill the sky. You maneuver your crosshairs, a plus mark (+), with the four arrow keys. When the crosshairs are positioned where you would like to fire, you press either the @ key or the spacebar, depending on which silo you want to launch a missile from. When you shoot a missile, it rockets across the screen at lightening speed, leaving a trail of smoke, to where the plus mark was and explodes in a burst of fire, destroying anything that is in the proximity of the blast. Each of the enemy's missiles is worth 10 points if it is destroyed. You try to blast the missiles out of the sky as quickly as possible so they don't get too close to your precious cities.

After the skies are cleared, the computer tallys up the number of ABM's remaining in your silos and the number of intact cities. Each missile left after an attack is worth 5 points and each city is worth 100 points. After every other attack you manage to survive, your bonus base point multiplier is increased by one. In other words, a city is worth 200 points after the third attack, 300 points after the fifth and so on. As you fend off more and more attacks the missiles gradually increase their velocity until they reach unimaginable speeds.

The game is over when you, by some stroke of misjudgement or simple bad luck, allow all of your cities to be hit by enemy missiles, thus leveling them to dust. This game will also end if you somehow manage, with the blessings of the gods, to resist 12 enemy attacks. Your sharp shooting will convince the enemy that victory over your country is impossible.

This single-player game comes complete with intensifying sound effects. It also keeps track of the highscore. Some of the elements it does not have that are included in the arcade game are jets and killer satellites whizzing across the screen, and also "smart missiles" which can dodge your missle bursts. Considering the TRS-80's limited graphics capabilities and the few inconsistencies between this game and "Missile "Missile Command", this program is a rather good TRS-80 version. "Missile Attack" is likely to become one of the most popular games in your software library and will never sit around collecting dust.

'Missile Attack'' is written to run on both the Model I and III TRS-80 and also on the PMC-80. It comes on disk or tape and can be purchased by mail order from Adventure International.

Owen Linzmayer

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TRS-80 SOFTWARE FOR SALE. I bought a new Model III so some of my Model I Level II software is for sale cheap. Examples: NEWDOS80 (disk) \$110, Super Utility (disk) \$30, Ed/Assem Plus (tape) \$25, Adventures 7-8-9 (disk) \$25. All programs are almost new and guaranteed to run. Write for list to Jeff Metzner, 100 State St., Room 900, Albany, NY 12207

FOR SALE USED INTEGRAL DATA PAPER Tiger 440 printer. Dot matrix tractor feed with TRS-80 cable. \$600 plus shipping. Call (206) 752-0094 (071)

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Stepwise software is now available for the TRS80 disk based microcomputer - machine
language - \$139 00 Barstrann Corp PO Box 265,
Mid City Station, Dayton, OH 45402 (071)

TRS-80 COLOR FILE "HANDLER" From select menu choose to copy data file from cassette, save file to cassette, list data, Add/Change/Delete data, create data file, sort in ascending or descending sequence. Always returns to menu. For customization program provides index of subroutine locations. Requires 16K Color computer send \$14.95 to Andrew Mucci, 75 Maitland Place, Garfield, NJ 07026 (071)

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CAN YOU DEMONSTRATE L2 16K TO schools, students, families in your area? Write for dealer discount schedule. AA Educational Services, 7211 S 180th, Kent, WA 98031 (071)

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EXATRON STRINGY FLOPPY SOFTWARE and patches: 1) ESF version of ENHBAS, enhances Basic from Cornsoft Group - complete package \$49.95, supplied on wafer. 2) Basic Toolkit (c) Bottom Shelf, patch only. 3) Microchess 1.5 (c) Peter Jennings, patch only. 4) Pinball (c) Acorn Software, patch only. 5) Basketball (c) Acorn Software, patch only. New patches will be added on a regular basis. Call or write for patch prices and additions to this list. Multi Media Systems, PO Box 41084, Indianapolis, IN 46241 (317) 839-6520 (091)

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Unclassified Ads

WANTED: BACK ISSUES 80-U.S. \$10.00 each. First year: all copies; 1980: Mar/Apr issue. Please contact me at (307) 635-1106 or 778-7550 - Bruce Armstrong

FOR TRS-80 RS-232 BOARD, FIX INTERmittent problems due to intermittent PC board connector with a connector brace. Easy to install. Only \$4.95. Gunn RS-232 board with two 8-bit in & two 8-bit out ports. \$35. Bare board and schematic. Schematic \$1.00 (TX residents add 5% tax). Gunn Industries, 704 Franklin Blvd, Austin, TX 78751

GL, A/R, A/P, PAYROLL FOR TRSDOS 1.2 Not Osborn's Fast ISAM double entry accounting, full screen and integrated. MAI 96 Dothan St., Arlington, MA 02174

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TRS-80 COLOR COMPUTER PROGRAMS send receive Morse code and RTTY. Hex debugger, also 20 line parallel I/O card, and other programs and things. Low prices, no middle man. Send SASE for info to Frank Lyman 12 Reservoir St., Cambridge, MA 02138

LINE PRINTER I (R/S Centronics 779) FOR sale, new in unopened box. With conversion kit for tractor and friction. Make offer. John French, 8045 Alida St., La Mesa, CA 92041 (714) 466-

WANTED: ONE YOUNG VIRGIN TO sacrifice to Mount St Helens. No experience necessary. Qualified applicants will be given one last chance to disqualify themselves. Contact 80-U.S. (206) 475-2219

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Notes Cont. From Page 122

By this time most of us have heard of the memory management problems involved with string storage, in terms of reassigning values. The proper use of the INKEY function is important to save memory management. As noted below, both program lines create an effective pause. The major difference lies in the fact that, in line 50, A\$ is reassigned each time the loop is repeated, whereas nothing is assigned at all in 100.

50 A\$=INKEY\$: IF A\$="" THEN 50 ELSE RETURN 100 IF INKEY\$="" THEN 100 ELSE RETURN -Donald J Goodwill

Making backup copies of your disks is like climbing mountains: If you keep backups it's like climbing up 3 feet and falling back 2. If you don't keep backups it's like climbing all the way to the top and falling all the way down-with a ton of rocks covering you. (Words of wisdom from your illustrious Publisher)

Model II users: Ever have a disk I/O end a program with files open? Or a brown-out cause your Model II to "freeze"? Or for some other reason, you get stuck with files left open that Basic refuses to close?

Under TRSDOS 2.0, the Directory will show open files with a "?" in the filename area. To close that file from TRSDOS (so it can be accessed from Basic) do a LIST filename. This will create an Error 6 condition. but will close the file. The file will now be useable from Basic.

TRS-80 LEVEL II

- PLANET LOCATOR As the name implies, this program will compute the location and display of the positions of the planets. It also provides important statistical data. This is a valuable tool for the
- **SLEAVE ONE** This game places you against the computer in a match (taking turns and using game rules) to pick up objects and leave the last object for your opponent. The game itself can be played without a computer, but there is a trick to winning.
- CHECK STORAGE AND YEAR END SUMMARY This two-program system handles the capture, sorting, summarizing and various other important functions needed to maintain you data. Graphics have been incoporated to simplify keying in the checks. The second program is the year end summary report. This is very useful at tax time or just as a expenditure analysis report.
- **SAMORTIZATION** This handy little program will calculate a sixcolumn display as follows: COL. 1 - Payment Number

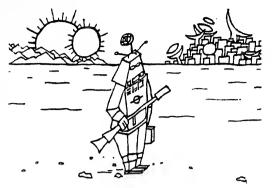
 - COL. 2 Monthly Payment Amount COL. 3 Portion Applied To Principal
 - COL. 4 Portion Applied To Interest

 - COL. 5 Remaining Principal Balance COL. 6 Principal Paid Back To Date
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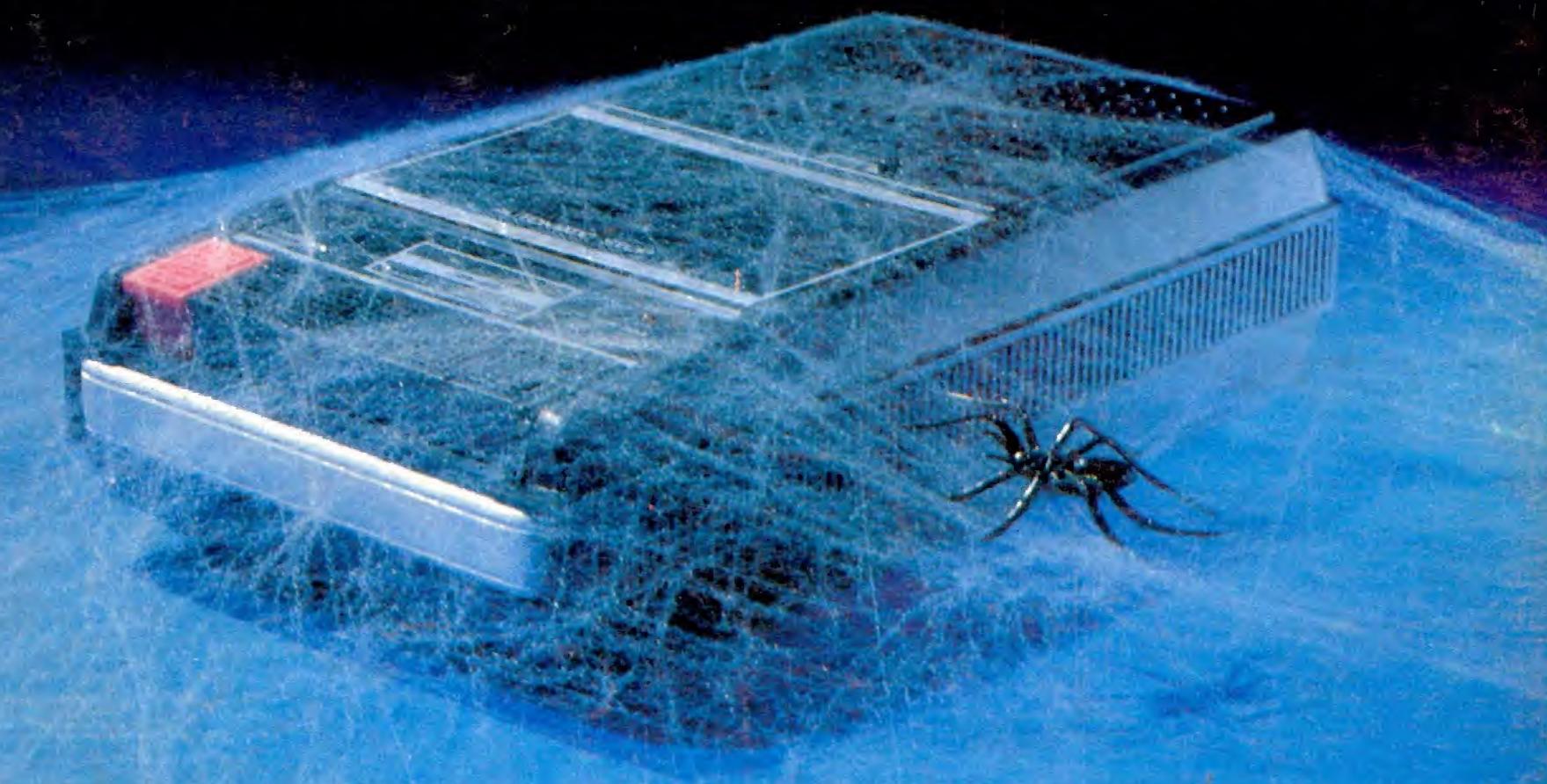
For the full story on how the LX-80 can expand your TRS-80, see your nearest LOBO dealer, or write or call:

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